Hands-On Solutions for HP-UX Users

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IBM software for HP-UX

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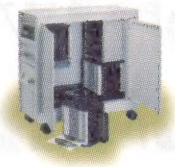

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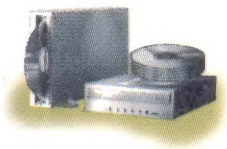

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CIRCLE 174 ON READER SERVICE CARD

hp-ux/usr

Hands-On Solutions for HP-UX Users

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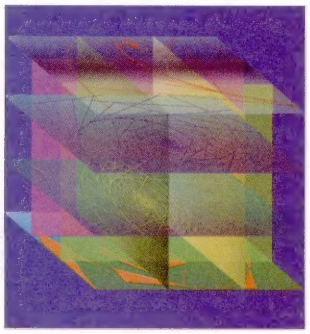

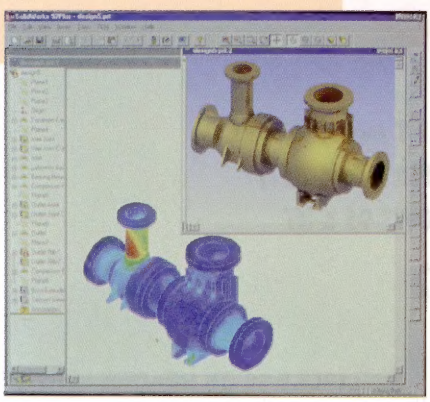

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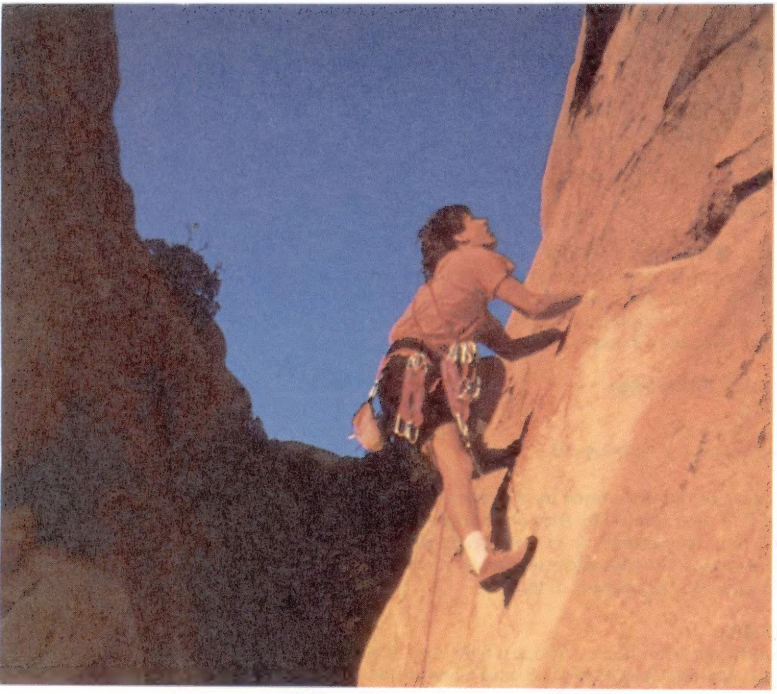
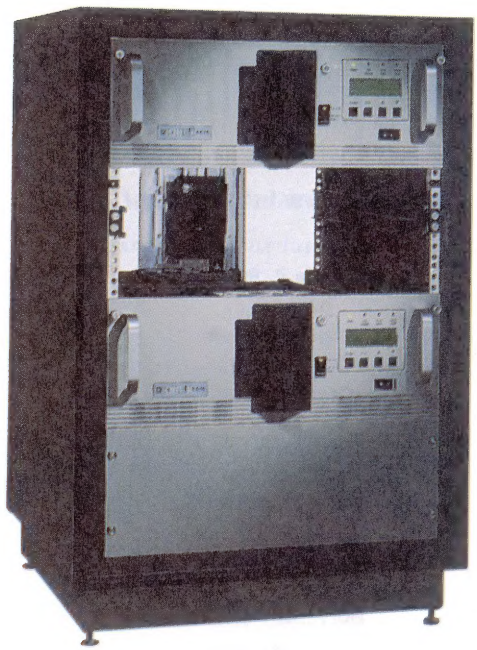
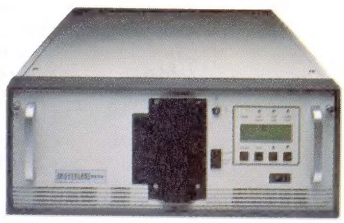
Cover Illustration by Michael Ehrhardt





Tough to scale

Protect your investment in tape backup equipment with the LibraryXpress system. Begin with a base module containing one or two DLT4000 or DLT7000 drives and 10 cartridges. This will provide you with a storage capacity of up to 700 gigabytes and a data rate of 72 gigabytes per hour.



Easy to scale

Scale up with any combination of stackable modules. Choose from a performance module, with up to five drives, or a capacity module, with 16 cartridges.

CIRCLE 33 ON READER SERVICE CARD

The exclusive Global Control unit passes cartridges between modules, allowing any cartridge to access any drive in the system, for true maximum system performance. Up to nine modules can be combined to create the ultimate automated storage system. Network administrators can continually fine-tune LibraryXpress expansion by balancing the ratio of tape drives to cartridges. Optimal configurations based on individual capacity, performance and budget requirements are easily achieved without the need to lock into a vendor-defined growth path of only a few possible configurations.

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As a not-for-profit association of HP computing professionals, Interex is dedicated to meeting the information, education, and advocacy needs of its members worldwide.

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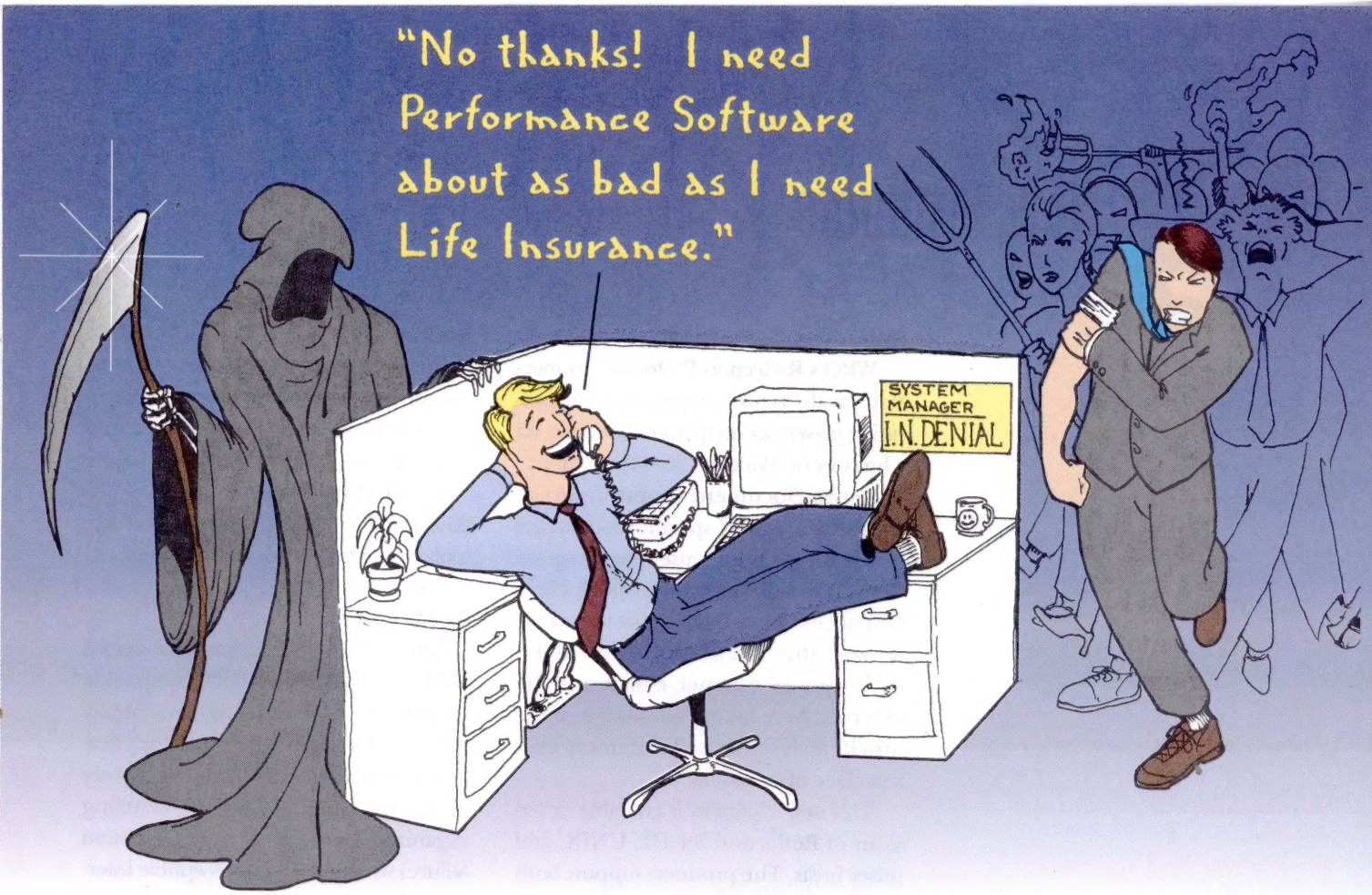
Operating independently from Hewlett-Packard, Interex has more than 20 years of serving HP computing professionals. Through its publications, conferences, and volunteer committee structures, Interex has the qualifications to represent you, a valuable member of the HP user community.



It's Time For Your Performance Review

System performance management demands a great deal. You must deal with current workloads while optimizing user response times. Simultaneously, you must plan for the future, anticipating where new performance problems will occur. **SOS/9000 Performance Advisor** for HP-UX and **SOS/X Performance Advisor** for X Windows environment will help you maximize your 9000's performance as well as provide you the information needed to effectively plan for the future.

- Take proactive control of your system's performance with very little effort.
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New Products

Enterprise Connectivity

WRQ's Reflection PC-to-host connectivity products now support ActiveX, providing powerful enterprise connectivity via a browser on Windows 95/NT desktops.

Active Document support, part of Microsoft's ActiveX specification, makes it easy for corporate users to integrate Reflection within a browser shell. Users can access host data from the same browser they use to access their internal corporate intranet, e-mail, and the external Web, taking advantage of the quick navigation and common user interface of browsers.

This new capability is available in versions of Reflection for HP, UNIX, and other hosts. The products support both Netscape Navigator and Microsoft Internet Explorer.

Pricing for Reflection for HP is $399; for UNIX, $299.

Contact WRQ, phone: (800) 872-2829 or (206) 217-7100, fax: (206) 217-0211, http://www.wrq.com.

Java Development

STEP Tools, Inc. has announced Version 1.6 of ST-Developer, which makes STEP easy to program with Java. In ST-Developer 1.6, Java objects are built from STEP objects using an EXPRESS-X compiler. The compiler generates code-to-map data from the neutral form defined by STEP into the forms needed by business processes. The STEP standards let organizations define "open" databases for their CAD/CAM/CAE and PDM information. ST-Developer lets programmers create applications to access this open information from Web browsers.

The 1.6 release also includes HTML versions of all documentation on the CD-ROM with the software, C and C++ libraries that can manipulate data defined by multiple standards simultaneously, an SDAI binding that conforms to the Draft International Standard, and improvements to the EXPRESS-G tools.

Contact STEP Tools, phone: (518) 276-2848, fax: (518) 276-8471, e-mail: info@steptools.com, http://www.steptools.com.

Clustering

Qualix Group, Inc. has announced HP-UX and IBM AIX/6000 compatible versions of QualixHA+ high-availability software. QualixHA+ provides application-oriented monitoring and recovery for clusters of up to 8 servers, enabling organizations to survive multiple system failures with almost no perceptible interruption to their business-critical applications. Intelligent application-oriented HA monitoring and load-balanced recovery minimize server downtime of mission-critical applications and servers. In addition, integrated modules permit individual monitoring of specific database and application environments.

QualixHA+ can recover an entire server or recover a single troubled application, enabling the original server to remain operational. Should a server or application fail, any one of the cluster members can take over the function of the troubled service. Only those services that have failed are migrated, so no disruptions are made to those not experiencing error conditions.

Prices start at $6,000 per node.

Contact Qualix Group, phone: (415) 572-0200, fax: (415) 572-1300, e-mail: info@qualix.com, http://www.qualix.com.

Mainframe to Client-Server Migration

APT of America, Inc. has announced G7-Migration, which helps companies

safety, accurately, and efficiently convert mainframe data and programs to run on the newer, most cost-effective client-server platforms. G7-Migration includes both a methodology and integrated products. The methodology controls and directs the move from mainframe to client-server, while the integrated products provide software tools and other aids that automate and facilitate each step of the migration. G7-Migration lets businesses migrate legacy applications and data to both UNIX and Windows NT client-server operating environments. It supports all major relational databases, including Oracle, Sybase, and Informix.

G7-Migration methods allow companies to perform migrations in a risk-free, orderly manner. With G7-Migration, the company is free to change between UNIX and Windows NT operating systems, as well as switch database vendors without penalty, at any time after migration.

Contact APT of America, phone: (941) 262-2555, fax: (941) 262-0527, http://www.g7-migration.com.

New from Raptor Systems

Intranet Security Control

Raptor Systems, Inc. has announced Raptor Axcess for

MegaCache-4000

In-Line Caching System

Imperial Technology has announced the MegaCache-4000, an in-line, easily installable caching system for HP computer users. The MegaCache-4000 immediately accelerates the I/O performance of all installed SCSI disk drives and RAID arrays connected to single- or multiple-host computers. Plugged in between the host computer and the targeted storage units, its multiple Ultra-SCSI ports and two 100-MB/second internal buses make data stored on disks available to the host in 0.1 milliseconds—1/100 the time taken by conventional disks.

The MegaCache-4000 has easily upgradable cache capacity, from 268 MB to 8 GB. It uses up to six independent interface modules that have two 40-MB/second Ultra-SCSI ports each. All ports can attach to either host computers or to disk storage. A combination of up to 12 ports accommodates virtually any single-, dual-, or multiple-host system requirement.

A user-partitionable solid-state disk enables the placing of known "hot files" in this partition to prevent them from being flushed out of cache by other temporarily active files.

The MegaCache-4000 is priced from $25,000.

Contact Imperial Technology, phone: (800) 451-0666 or (310) 536-0018, fax: (310) 536-0124, http://www.imperialtech.com.

TelAlert

Paging/Voice Software

Telamon has announced Release 4 of TelAlert, its general-purpose paging/voice notification and response product. TelAlert now supports Windows NT, as well as UNIX platforms.

TelAlert is designed to notify support personnel about system or network problems detected by management platforms of help desk applications. It supports numeric, alpha, and two-way pagers; provides interactive voice response; drives electronic sign boards; sends information to modems, electronic mail, and voice mail; and relays alerts to external alarm systems.

Schedules specify dates and times that TelAlert is allowed to send messages to the user, group, or destination. Router, server, payroll, and field service groups can be configured to include all the staff members capable of solving particular problems.

TelAlert pricing starts at $3,000.

Contact Telamon, phone: (800) 622-0630 or (916) 622-0630, e-mail: sales@telamon.com, http://www.telamon.com.

UNIX and Windows NT. Raptor Axcess is an information access control application that uses an open, extendible, scalable architecture. It provides secure, centralized, and selective access to distributed, Web-based information in intranets.

Web-based single sign on provides maximum performance from intranet information systems. Axcess is completely vendor-neutral, as well as database independent, enabling users to establish secure information access regardless of which firewalls, Web servers, platforms, or browsers they use.

Raptor Axcess's base license is priced at $15,000. Control for each additional Web server is $4,000 per server.

News-Group Site Filtering

Raptor Systems, Inc. has announced NewsNOT, a subscription service that permits schools and businesses to filter out potentially objectionable news-group sites on the Internet. Integrated fully into THE WALL, Raptor's simple, affordable firewall product, NewsNOT will enable subscribers to limit employees' and minors' access to network news sites, which may include objectionable materials.

In addition, Raptor also offers WebNOT, which enables firewall administrators to manage access to content on the Web and in network news sites.

Contact Raptor Systems, phone: (617) 7700, fax: (617) 487-6755, http://www.raptor.com.

Manufacturing Execution System

FASTech Integration, Inc. has announced FACTORYworks 2.2, its latest version of FASTech's integrated Manufacturing Execution System (MES) software solution.

FACTORYworks 2.2 includes functionality and performance enhancements, and features a Recipe Management Services that enables centralized recipe storage and management; Carrier management, which enables creation of carriers and carrier types and maintains carrier information; and Context Attribute Management, which defines context attribute tables.

Combining graphical configuration tools with an integrated suite of runtime applications, FACTORYworks provides a complete MES environment for managing shop floor operations. It incorporates a three-tier, object-oriented, client-server architecture.

Contact FASTech Integration, phone: (617) 259-3131, fax: (617) 259-3188, http://www.fastech.com.

New from Legato Systems

Storage Management

Legato Systems, Inc. has announced NetWorker Power Edition for Microsoft Windows NT Server Enterprise Edition 4.0. NetWorker Power Edition is a high-end solution for backup and recovery of large Windows NT Server installations. Power Edition scales effectively to harness the maximum I/O bandwidth of high-end Intel platforms while otherwise minimizing use of CPU resources.

NetWorker Power Edition makes extensive use of multiple, parallel processes to speed backup and restore operations. It scales to deliver better performance on systems with more than four processors.

NetWorker Power Edition uses advanced shared-memory techniques to speed the backup and recovery process in large Windows NT implementations. The use of 4GB Memory Tuning increases the potential RAM allocated to Power

Edition on a VLDB system. Power Edition clients on Windows NT Enterprise Server Edition 4.0 provide file- and system-level backup and recovery for cluster nodes.

NetWorker Power Edition is priced at $5,000.

Enterprise Storage Management

Legato Systems has also announced NetWorker 4.12 for NetWare, which offers full support for all NetWare data and resources, including full NDS file and object level backup/recovery.

Key new features in NetWorker 4.12 for NetWare include support for additional OS versions, simplified installation from multiple platforms, and support for new SMS resources that improve NDS backup and recovery. A new administrative Windows NT-based GUI manages all NetWorker servers from a single interface, enabling users to configure, monitor, and manage multiple servers on any NetWorker platform simultaneously.

Pricing for the NetWorker 4.12 for NetWare starts at $1,000 for the WorkGroup Edition and $2,000 for the Network Edition.

Contact Legato Systems, phone: (650) 812-6000, fax: (650) 812-6032, http://www.legato.com.

New from O'Reilly & Associates

Designing with JavaScript

O'Reilly & Associates have announced *Designing with JavaScript*, by Nick Heinle. This is a book for Web authors who want to dive right into JavaScript and learn by doing. Written for nonprogrammers, it introduces programming principles in the context of creating scripts that make interactive, engaging Web sites. The book gets the user writing code right away, explains why the scripts work, and shows how to alter them to get custom effects. The examples, taken from real Web sites, illustrate how to make a madlib game, check browsers for plug-ins, create "rollover" effects, and more. By the end of the book, the reader will be able to write groundbreaking scripts from scratch. The explanations are clear, detailed, and accessible; every script, concept, and line is explained and illustrated.

Designing with JavaScript: Creating Dynamic Web Pages (ISBN: 1-56592-300-6), is priced at $29.95.

Learning Perl, 2nd Edition

O'Reilly & Associates has released *Learning Perl, 2nd Edition*, by Randal Schwartz and Tom Christiansen. This new edition fully covers the world of Perl, Version 5. Examples and exercises have been radically updated to reflect typical usage under Perl 5, and the book has been expanded to introduce Perl references and CGI programming.

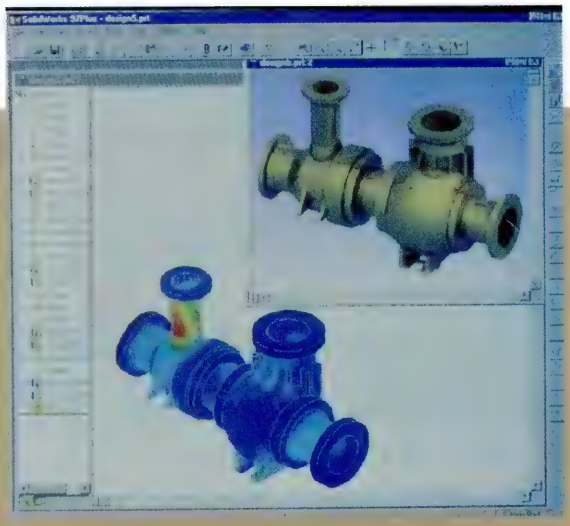
Learning Perl, 2nd Edition provides a systematic, step-by-step, tutorial approach to learning the language. The book includes numerous short code examples throughout all the main features of the language. In addition, each chapter contains exercise problems, together with their solutions. Anyone who works through the book will be capable of programming with a broad and productive range of Perl features.

Learning Perl, 2nd Edition (ISBN: 1-56592-284-0), is priced at $29.95.

Contact O'Reilly & Associates, phone: (800) 998-9938 or (707) 829-0515, fax: (707) 829-0104, http://www.ora.com.

UNIX Imaging Products

Augrin Software/AutoGraph International (AGI) has announced EasyCopy/Page and EasyCapture, parts of its EasyCopy and FleXprint product



COSMOS/Works 3.0

Integrated Design Analysis

Structural Research & Analysis Corporation has announced COSMOS/Works 3.0, its integrated design analysis program for SolidWorks. COSMOS/Works 3.0 meshes and quickly analyzes large, real-world models with over a million degrees of freedom. This capacity lets designers model all their complex parts in a user-friendly and intuitive environment.

Users can apply localized boundary conditions, such as cylindrical and spherical constraints, using existing reference planes and axes within SolidWorks. Shell elements—surface elements of uniform thickness—help design engineers analyze thin-walled structures more effectively.

COSMOS/Works prices start at $4,995.

Contact Structural Research & Analysis Group, phone: (310) 207-2800, http://www.cosmosm.com.

lines for input, conversion, and output management.

EasyCapture is designed for easy integration into applications and provides the screen capture function for EasyCopy/Page and other AGI products.

Designed for UNIX workstations, EasyCopy/Page can import and place on the page images in any of the supported formats, manually or with the use of autoarrange. Image size, position, and colors can be edited. EasyCopy/Page integrates with other programs, which can be installed to act as import filters to expand the number of supported file formats.

EasyCopy/Page pricing starts at $1,695, and EasyCapture pricing starts at $395.

Contact AGI, phone: (408) 436-7227, fax: (408) 436-7255, e-mail: sales@augrin.com, http://www.augrin.com.

CD Recording

Kodak has announced that Young Minds, Inc. will provide the enhanced option for its Disc Transporter aimed at meeting the needs of users of CD-production systems. The adapter kit's open architecture allows Young Minds to combine its CD-Recordable solutions and the robotics of the Kodak Disc Transporter with internal half-height CD-R drives from leading manufacturers.

With this agreement, the Kodak Disc Transporter is available with CD-R drives costing less than $1,000.

Working with the Kodak Disc Transporter, Young Minds CD Studio is a networkable, scalable, "plug-and-play" system that fits a wide range of imaging and other CD-R applications. CD Studio combines innovative premastering software, an intelligent controller, and CD Writer.

Contact Kodak, phone: (716) 588-8167, http://www.kodak.com.

Manufacturing Software

ShopPro Software has announced ShopPro Version 8.2, which exploits real-time Windows graphics capabilities for a quicker fix on problem areas for businesses addressing ever-changing situations.

A complete graphical scheduling system allows users to instantly review bottlenecks and quickly resolve scheduling conflicts. A Project Estimating Worksheet assists manufacturers of complex equipment in developing accurate cost budgets for specific components or modules. An order entry module enables users to process multiple line items against a single purchase order, while still permitting the ShopPro system to route, schedule, cost, and control line items individually or in total. An Executive Information System allows users to view aspects of the business that are operating outside predetermined parameters.

ShopPro's Windows system runs as a true client-server application on PC networks (Novell or Windows NT), as well as Windows 95 applications on HP-UX and other platforms.

Contact ShopPro Software, phone: (513) 733-0066 fax: (513) 733-9816, e-mail: info@shop-pro.com, http://www.shop-pro.com.

ANSI/ISO C++ Library

ObjectSpace, Inc. has announced that all versions of its ANSI/ISO C++ Standard Template Library (STL), sold under the brand name Standards<Toolkit>, are available for immediate download from *http://www.objectspace.com* free for most commercial uses. Today the most portable version of STL is available on the Internet from ObjectSpace, complete with source code and online HTML tutorials.

ObjectSpace provides several extensions to the ANSI/ISO Standard C++

Library, including advanced libraries for multithreading and distributed system development. These libraries work out of the box with the Standard C++ Library shipped as part of the compiler, or with Standards<ToolKit>, now freely available from ObjectSpace. The ObjectSpace product line of Standard Extensions includes Foundations<ToolKit>, Communications<ToolKit>, and Web<ToolKit>. These products are also sold as a bundle called Systems<ToolKit>.

Contact ObjectSpace, phone: (972) 934-2496, fax: (972) 663-9099, http://www.objectspace.com.

New from NxTrend Technology

Distribution Software

NxTrend Technology, Inc. has announced Version 8.0 of its Trend distribution software solution. Version 8.0 features enhancements to the existing product and introduces three new modules: Value Add, Warehouse Logistics, and Corporate Assistant. These modules incorporate emerging standards in the industry such as push technology, Internet enabling, and data warehousing.

Trend 8.0 enhancements address the areas of data archiving, financial balancing, service warranty remanufacturing, and year 2000 support.

Distribution Management

NxTrend Technology has also announced Version 17.7 of its Supply House Information System (SHIMS). The enhancements include a new login screen, security system, alternate access information setup, and menu structure. The new login allows quick, accurate access to needed software issue information. The new security system enables customized access to SHIMS accounts and menus. The new alternate access information setup provides the ability to customize the information that displays in the scroll windows throughout SHIMS.

Additional product tracking and cash application efficiency features have been added.

Contact NxTrend Technology, phone: (719) 590-8940, fax: (719) 528-1465, e-mail: info@nxtrend.com, http://www.nxtrend.com.

Mathematical Computation

Wolfram Research, Inc. has released Version 3.0.1 of its Mathematica system. New optimizations have led to major speed increases in almost all kernel operations under both Windows 95 and NT. In particular, performance on Pentium-class processors has been greatly enhanced.

Mathematica now performs even more algebraic transformations, sums, simplifications, and symbolic integrations than before—vastly more than were possible for either computers or humans.

Printing under Windows has been improved and now requires significantly less memory.

Wolfram Research also announced a Mathematica-powered Web site, The Integrator (*http://www.integrals.com*), which can solve integrals interactively via a Web browser. The user types in an integral, which The Integrator sends to a Mathematica kernel as a MathLink message. The integral is solved using Mathematica's built-in integrate function, then returned to the kernel, which embeds the output in a Web page on the fly.

Contact Wolfram Research, phone: (217) 398-0700, fax: (217) 398-0747, e-mail: info@wolfram.com, http://www.wolfram.com/.

Continued on Page 66

Question and Answer

Q: In a previous column you indicated that using *lp* to output to a file would overlay the contents; yet I observed that *lp* is appending instead.

A: Oops...When using the dumb model script, this appears to be the behavior. I suspect it is something inherent in the way the spooler opens the output file, but I don't know of a way to change this.

An alternative is to replace the dumb model script with one that you write in which the output device file is always */dev/null* and the script creates the desired file from a *-o* option. That way, users could specify their own print files on the command line.

For users who cannot specify command line options, you could have the script create a unique print file, something like:

```
cat > /tmp/$UID.$$.prn
```

where *$UID* is set from the params passed to the script ($2). See the dumb script for info on how to parse out the user ID. The $$ inserts the current process ID (PID) into the string, so the user's output file would be something like:

```
/tmp/blh.1234.prn
```

and every *lp* command would generate a new file name. Or the script could simply write to */tmp/$UID.prn*, but just before starting the *cat* command, remove the file and recreate it in the script.

Q: As a new account manager of an HP-UX trusted system (Version 9.04) at a small community college, I have been using SAM to add/remove accounts for student e-mail. This is an increasingly time-consuming task. Is there a way to automate the process using other software or scripts?

A: You might try using the *adduser* script that comes with SAM. *Listing 1* is simple batch program that will generate encrypted passwords. You can get the undocumented params to */usr/sam/bin/addusr* by reading */usr/sam/log/samlog*. As an example:

```
addusr -u "timc" -g "users" -d "/users/timc"
-i "Joe Doe,3179/Los Altos,820-6537," -s "/bin/ksh"
-p "9Mx4NmUtRmVpE" -v 391
```

From this logfile entry, the params can be determined:

- *-u* = user name
- *-g* = group
- *-d* = home directory
- *-i* = full name for user
- *-s* = shell
- *-p* = password (encrypted, ready to be pasted into *passwd*)
- *-v* = user ID number

The *addusr* program will also copy all files in */etc* that have the form: *d.<name>* (as in *d.profile* and *d.kshrc*) to the user's *$HOME* directory and remove the leading d (*d.profile* becomes *.profile*). These are the skeleton files needed by new users.

As with all C programs, the *#include* statements must begin in column 1; the rest of the code may have leading spaces.

For 10.xx, SAM provides a documented *useradd(1m)* command with more options. The *pw* program in *Listing 1* can be used with 10.xx but *usradd(1m)* does not provide an option to supply a password when building a new account.

Q: I wrote a script to perform some tasks in the background and it works when I run it from a login, but fails when I put it into *cron* or into the intial boot rc files. It says: `Command not found.`

A: Users new to UNIX systems may become accustomed to the login environment they work within, but this environment does not follow the user into non-login sessions such as *cron* and startup/shutdown. Your user ID does not carry with it the *$PATH* value or any other special variables set when you log in. "Command not found" probably refers to a command located in a non-standard location.

There are a couple of schools of thought to writing such scripts:

- Set $PATH at the start of such scripts to include the paths needed by the script. The downside is the extra searches required to locate a specific program (searches in locations where the program does not exist).

LISTING 1 ***Password Generator Program***

```
#include <stdio.h>
#include <time.h>
   /* 1st param is the desired password  */
   /* A random seed (2 chars) will be  */
   /* automatically chosen.*/
   /* For good passwords:  */
   /*    Use random chars, mixed apha-  */
   /*    numerics and MiXeD CaSe for  */
   /*    better protection.*/
main(argc, argv)
int argc;
char *argv[];
{

 char salt[3];
 char *EncryptedPasswd;
 int CheckRand;
 int Fixup;
 int SeedChar;

 printf("\nUsage: pw  <password_to_encrypt>\n\n");
/* Generate a random starting point for seed characters */

 srand(time(NULL));
 for ( SeedChar = 0; SeedChar <= 1; SeedChar++) {
    CheckRand = 46 + rand() % 76;
/* random number from 46 to 122  */
    Fixup = 7 + rand() % 13;
/* random number from 7 to 20    */
    salt[SeedChar] = toascii(((CheckRand >= 58 && CheckRand <= 64) ||
    (CheckRand >= 91 && CheckRand <= 96)
    ? CheckRand + Fixup : CheckRand));
 }

 EncryptedPasswd=crypt(argv[1], salt);
 printf("\nRequested pw= %s, Seed= %s, encrypted pw= %s\n",
         argv[1], salt, EncryptedPasswd);
}
```

- Explicitly hardcode the full pathname for the program, as in `/usr/bin/grep -i testvalue /etc/passwd` rather than just using *grep* by itself.

I prefer the latter for efficiency but take it a step further to cross versions of HP-UX in which the same script runs in both systems:

```
        MYREV=`uname -r | cut -f 2 -d .`
        if [ $MYREV -lt "10" ]
        then
            MYREV=`echo $MYREV | cut -c 2-5`
        fi
MYREV=`echo $MYREV | cut -c 1-12`
if [ "$MYREV" -lt "10.0" ]
then
        TENO=/bin/false
        NOTTENO=/bin/true
        HPUX=/hp-ux
        CHECKLIST=/etc/checklist
        SYSLOG=/usr/adm/syslog
        SULOG=/usr/adm/sulog
        LAST=/etc/last
        FTP=/usr/bin/ftp
        HP9000300=/bin/hp9000s300
        HP9000700=/bin/hp9000s700
        GREP=/bin/grep
        IFCONFIG=/etc/ifconfig
        USRTMP=/usr/tmp
        IOSCAN=/etc/ioscan
else
        TENO=/usr/bin/true
        NOTTENO=/usr/bin/false
        HPUX=/stand/vmunix
        CHECKLIST=/etc/fstab
        SYSLOG=/var/adm/syslog/syslog.log
        SULOG=/var/adm/sulog
        LAST=/usr/bin/last
        FTP=/usr/bin/ftp
        HP9000300=/usr/bin/hp9000s300
        HP9000700=/usr/bin/hp9000s700
        GREP=/usr/bin/grep
        IFCONFIG=/usr/sbin/ifconfig
        USRTMP=/var/tmp
        IOSCAN=/usr/sbin/ioscan
fi
```

This preface to the script means that I can write a script using *$GREP* or *$FTP* (rather than just the program names) and be assured that a full pathname will be used. In the example, you can see other features that have been coded to match the op system rev.

Q: I am writing a shell script that needs to strip out just pathnames from a file containing full pathnames and filenames, but *dirname* seems to be quite slow. Any alternatives?

A: Several. Assume that the file was created from a *find* command as in:

```
find /usr/share/lib/terminfo > /usr/tmp/testme
```

1. `sed -e "s:/[^/]*$::" /usr/tmp/testme`
2. `while read MYPATH; do echo ${MYPATH%/*}; done < /usr/tmp/testme`
3. `perl -pe 's:(.*)/.*:$1:' < /usr/tmp/testme`

Q: I just installed a 10.xx system and my users are unable to log in using *ftp*. The error is "incorrect password." Telnet works just fine. What's happening.

A: *ftp* is a special environment;. it does not log in as would a terminal but instead uses the *ftp* daemon to handle user validation. However, the user's choice for a shell (from the password file) is not used by *ftp* in the same way as telnet. Instead, it validates that the user's shell is found in the */etc/shells* file. Be sure all the shells used on your system are listed there for the use of the *getusershell(3c)*.

Q: How does the man command process a man page, especially if the page is compressed?

A: Here's the equivalent of the man command:

```
cd /usr/man/cat1.Z
cat id.1 | zcat | tbl -TX | neqn | nroff -man | col -x |
                                                more
```

Note the use of *cat* piped to *zcat*. *zcat* insists on appending

.*Z* to any filenames without the .*Z* extension, so the pipe protects the filename from this behavior.

Q: I have seen patches that offer a new LVM bad block relocation policy at 10.x. How does it differ from the existing policies and how is it enabled?

A: The bad block relocation policy is set via the *lvchange* or *lvcreate* command. The *-r* option is used:

```
# lvcreate/lvchange -r y|n|N
```

The *y* flag means that bad block relocation will be used when a bad block is encountered. This means that an alternate block will be allocated from a reserved pool. The bad block directory will contain the bad block and the alternate. If the relocation is successful, no error is returned at the application level. All subsequent I/O for the bad block will be directed to the alternate.

The *n* flag means that LVM does not attempt to relocate the bad block. Instead, it is marked as defective in the bad block directory. Subsequent I/O to this block will not be attempted since it exists in the directory.

The *N* flag means that LVM does not attempt to relocate the bad block, but it is not added to the bad block directory. Subsequent I/O to this block will continue to be attempted.

It is important to understand the difference between the *n* and *N*. If a block is marked in the bad block directory, LVM will not attempt to access this block. Therefore, if the bad block, which appears in the bad block directory, has been fixed (e.g., diagnostics used to hardware spare the block), LVM will still return an error. This will be the case when policy *n* is being used. If policy *N* is being used and a bad block is hardware spared, LVM will access the block successfully once fixed.

Q: What is the maximum amount of shared memory available at 10.30?

A: At 10.20, the maximum amount of shared memory is 1.75 GB. At 10.30, 2.75 GB is the maximum shared memory size. Applications can address up to a system-wide limit of 2.75 GB of shared memory. This 2.75-GB limitation is also available at HP-UX 10.20 with patches.

Only executables that are linked to the new SHMEM_MAGIC executable type can access up to 2.75 GB of shared memory. Note that SHMEM_MAGIC is an interim solution until 64-bit addressability is available with a true 64-bit kernel.

Q: Is it possible to tell when a product or bundle was installed on a system?

A: You can obtain this information via the *swlist(1M)* command. It is possible to display attribute information regarding objects at all levels. The man page for *sd(4)* describes all of the attributes. To find the installation date of the product Glance:

```
#     swlist -a install_date -l product Glance
#     Initializing...
#     Contact target "systemB"...
#     Target:  systemB:/
#
      Glance        199704181415.36
```

The output shows that the product was installed on April 18, 1997 at 14:15:36. Using the *-v* option with *swlist* will also display all of the attribute values for the specified level. Here is a small amount of output from the command:

```
# swlist -v -l product Glance
  Glance
product
tag                     Glance
data_model_revisio      2.10
control_directory       Glance
size                    20598716
revision                B.10.20.89
title                   HP GlancePlus/UX
date                    04/18/97 14:15:36 EDT
timestamp               861387336
```

```
install_source          systemA.atl.hp.com:/teno/800/10.20/Jan97.3
install_type            physical
architecture            HP-UX_B.10.20_700/800
machine_type            9000/[678]??
all_filesets            GLANCE GPM GPM-JPN
location                /opt/perf
```

Q: What is DHCP and how is it used?

A: DHCP is an acronym for "Dynamic Host Configuration Protocol." It is an emerging Internet standard defined by these Internet RFC's:

- RFC 1541 Dynamic Host Configuration Protocol
- RFC 1542 Clarifications and Extensions for the Bootstrap Protocol
- RFC 1533 DHCP Options and BOOTP Vendor Extensions
- RFC 1534 Interoperation Between DHCP and BOOTP

From RFC 1541:

"The Dynamic Host Configuration Protocol (DHCP) provides a framework for passing configuration information to hosts on a TCP/IP network. DHCP is based on the Bootstrap Protocol (BOOTP), adding the capability of automatic allocation of reusable network addresses and additional configuration options. DHCP captures the behavior of BOOTP relay agents, and DHCP participants can interoperate with BOOTP participants."

The overall purpose of this is to reduce the work necessary to administer a large IP network. DHCP servers have been supported at HP-UX 10.10 and later releases. DHCP addressing has been supported since HP-UX 10.20 for Series 700 and Series 800 clients, through either *auto_parms(1M)* or Ignite-UX. The term "client" indicates a system that receives its IP address assignment from a DHCP server.

The DHCP server can be administered through SAM or manually. Via SAM, a number of tasks are available from the "Bootable Devices" subarea within the "Networking and Communications" area. The command line tool *dhcptools(1M)* further simplifies the management of DHCP devices.

Q: Must my system be running 10.10 to update to 10.20?

A: No. You can update your system directly to 10.20 from 10.01.

At 10.01 or 10.10, you must install and run *swgettools* from your 10.20 media to get the appropriate SD tools on the system. For more information, please refer to *Installing HP-UX 10.20 and Updating 10.0x to 10.20* (B2355-90119).

Q: Is HP VUE still available at 10.30?

A: At HP-UX 10.30, HP VUE is no longer shipped on HP-UX systems. HP VUE is obsolete. At 10.30, HP VUE as the HP-UX desktop application is replaced by the industry standard UNIX desktop product, CDE (Common Desktop Runtime Environment). HP-UX 10.20 is the last release of HP-UX on which HP VUE is supported. HP VUE 3.0 was the last version of HP VUE released.

The *VUEtoCDE* application provides a way to migrate individual and system-wide HP VUE customizations to the CDE desktop. *VUEtoCDE* is included with the HP-UX 10.10, 10.20 and 10.30 operating systems. Refer to *HP CDE Getting Started Guide* (B1171-90104) for instructions for using *VUEtoCDE*.

Q: Is the file */etc/disktab* still used at 10.x?

A: It's possible still to use */etc/disktab* when creating file systems, but its use is discouraged. The file is provided only for backward compatibility with previous releases. The command *newfs(1M)* uses appropriate parameter defaults based on the size of the file system. These defaults can be overridden with command line options.

Q: Do I need to reduce the mirrors of system logical volumes before I update my system? The mirroring software will not be updated because it is on the application media.

A: It is not a requirement to reduce the mirrors. Although the mirroring product will not be replaced during

the operating system update, your existing mirrors will still be recognized.

However, it is possible to use for your update a disk depot that contains both operating system products as well as application products. Use the *swcopy(1M)* command to create the depot.

Q: What is HPDPS?

A: DPS stands for Distributed Print Service. It was introduced at 10.20, and its basic functionality is bundled with HP-UX. HPDPS can handle networks with thousands of printers, spoolers, and clients.

It can automatically select printers that are appropriate for a print request based on the requirements of the job. It can be configured to balance the workload for a pool of printers. It is compatible with existing *lp*- and *lpr*- based spoolers on supported systems. HPDPS functionality can be accessed via *lp* spooler commands. Both HPDPS and the *lp* spooler can be installed and configured on the same system. ◧

General HP-UX questions are answered by Bill Hassell, a support engineer at the HP Atlanta Response Center. He can be contacted via e-mail at blh@hpuerca.atl.hp.com. Workstation questions are answered by Susan Potter, an HP-UX system support engineer in the Atlanta Response Center. Her e-mail address is sup@atl.hp.com.

HP-UX Systems Administration

by Chris Curtin

Configuring and Managing File Access

This month I'll be discussing a fairly basic but nonetheless critical part of administering and securing your system: File Access. I'll discuss the traditional approach in UNIX, describe some HP-UX-specific enhancements to this approach, and then discuss a newer and better way of restricting who can access your files.

Traditional Access: */etc/group* and *chmod*

The traditional way to restrict access to a file in all flavors of UNIX is to set permissions on the file. There are three levels of permissions: Owner, Group, and World or Other. For each file, permissions can be defined on what each of these levels can do to/with the file. The choices are: Read, Write, and Execute. The permission on a file can be set to allow any combination of the permissions for each of the levels.

The ownership of a file is divided into two parts: the Owner and the Group. The Owner is often the person who created the file and is considered the ultimate authority on its use. The Group ownership is a grouping mechanism to allow multiple users who share something in common access to the file. The Group permission is necessary to add an additional layer of 'my coworkers' between the Owner and everyone else.

For example, if the Owner of a file is George and the file is part of the source code to an application, you may want the other developers on the team to be able to read the file but not modify it (or you may want them to be able to modify it also). But you don't want the members of the Accounting group to access it.

Executing *ls -al* or *ll* on a file will list the permissions, the owner, and the group for the file.

For more information about setting the owner, group or permissions on a file see: *chown(1)*, *chgrp(1)*, and *chmod(1)*.

Access permissions seem pretty simple until you think about a real-world system. In a real system, you would want your users divided into groups around their jobs. You might have a system administration group, a COBOL developer group, a testing group, a C++ development group, and a management group. First, how do you specify the primary group for a user and how do you allow a user to be in multiple groups?

The first question, how to specify what the primary group for a user, is easy. The default group is specified in the */etc/passwd* entry for the user. You can use SAM to change this.

The second question, how to allow a user to belong to multiple groups is also easy. The file */etc/group* contains an entry for each group and lists the users who are part of that group. Theoretically there is no limit to the number of groups a user can belong to or the number of users in a group. In practice a large number of either is hard to maintain. (Also HP-UX has had some bizarre bugs at the file access and NFS levels if a user belonged to too many groups or too many users were part of a group. Check that you have the latest patches before trying to redesign your group scheme.)

Now that users are part of multiple groups, how do they indicate what group they want to belong to at the current time? By default when users log in, the system sets the group to the default from the */etc/passwd* file. If they want to change groups later, they can use the

newgrp(1) command.

I'm not sure of the history, but I would think that *newgrp* was a command to create a new group, not change it. However, *chgrp*, which is used to change the group of a file, was already taken.

Note: you can add a password to each group in */etc/group*, which requires that the user provide the password before *newgrp* will change the current group for a user. I don't know of anyone who uses this feature and, in the 10.00 documentation, HP recommended against using it. No reason was given why not to use it.

Determining Access Permissions To A File

Once the groups have been configured, it is important to know what steps the operating system goes through to determine if a user can access a file. In a nutshell, the following are tried:

1. If the ID of the user matches that of the file, the Owner permissions are checked. If the permission is granted, the access is allowed.
2. If the current Group ID of the user matches the Group ID of the file, the Group permissions are checked. If the permission is granted, the access is allowed.
3. Finally, the World/Other permissions are checked. If the permission is granted, the access is allowed.

You'll notice that only the current Group ID of the user is checked, not the Group ID of all the groups the user belongs to. The user is forced to use *newgrp* to be given group-level access if the default group does not match the Group ID of the file.

HP-UX Enhancement: */etc/logingroup*

HP-UX adds a feature to the traditional file access rules: */etc/logingroup*. This file defines the list of all Group IDs to be assigned to a user at login time. This prevents the problem specified in the previous section, where a user must use *newgrp* to access a specific file.

The upkeep of the */etc/logingroup* file is not handled by SAM. Therefore most installations link */etc/logingroup* to */etc/group*. This way all changes to */etc/group* are reflected in the user's environment.

Note: linking these files together restricts the granularity of the functionality */etc/logingroup* provides. You may *not* want your users to have access to certain files by default. Sometimes it is necessary to force them to change their group before accessing the file. System administration scripts come to mind as one area where this functionality might not be that useful.

Additional Group Functionality

HP-UX also adds some additional group-level functionality that allows all members of a group a specific permission. These permissions often do not have anything to do with file access, or those that do are used in a specific way by the operating system.

The command to do this is *setprivgrp(1M)*. I could write an entire column about this command, so I'll just give an example of its use:

Long-time readers will remember my column about setting up a real-time getty on the system console. In that article we used the *setprivgrp* command to allow a group of users to define real-time priorities on a process. The command was `setprivgrp -g RTPRIO`. This command gave all groups (the *-g* option) the abili-

ty to run processes in real-time.

Problems With Traditional File Access

The traditional way of providing access to files is certainly a strong system. It is implemented on a lot of systems and most users understand it. However there are still several problems with it:

1. Without the HP-UX enhancement of */etc/logingroup*, users must remember to use the *newgrp* command to access files not in their default group.
2. Upkeep of */etc/group* is cumbersome, so most systems place all users in a 'users' or 'staff' group, in effect, removing the usability of the Group file permission. Since everyone is in the same group, why use group-level permissions?
3. If you want to allow only specific people access to a file, they must be in their own group. Since only root can modify */etc/group*, users cannot create their own groups to restrict access to their files at this level.

Access Control Lists (ACL)

A solution to the problems defined in the previous sections is a user-level permission list, Access Control Lists (ACL). ACL allow a user to specify, at the user and group level, permissions on a file. Think of it as giving users a key to your desk, except the key only works when they are holding it and if you told your desk it is okay.

ACL permissions are assigned using the *chacl* command. The *chacl* command has the following format:

chacl 'user.group operator mode' file

The *user.group* defines the user ID and the group ID of the user being configured. The *operator* parameter is '=' to define the exact permission replacing what is currently defined, '-' to remove a permission, or '+' to add a permission. The *mode* parameter defines the permission. Values are: 'x' for execute, 'r' for read, and 'w' for write.

For example: `chacl 'ccurtin.users +rw' /etc/passwd` allows the user 'ccurtin' read/write access to */etc/passwd*.

You can determine if a file has an ACL defined for it by using *ls -al* or *ll* and checking the last character of the permission string. If it is a '+' then an ACL is defined for the file. You can then use *lsacl* to see the configuration of the ACL for the file.

My most common use of this functionality is for restricting access to common project and system administration commands. Rather than defining a Project1 group and a Project2 group, I just set up ACLs for the files with the users who need access to them.

Warnings About ACL Usage

While Access Control Lists give you finer control of access to your files, there are some areas you need to be concerned about:

1. Access Control Lists are not supported on VxFS file systems.
2. Access Control Lists cannot be accessed across NFS file systems. The permission checking will occur, but the use of *lsacl* or other commands is not supported.
3. Since the client cannot see the ACL configuration, modifications to files with ACL configurations on NFS file systems can remove the configuration.
4. Most system commands support ACLs, but some, such as *cpio*, *dump*, and *tar*, do not. Remember this when you are moving files around using these commands. See the man page for a specific command if you are not sure of its effect on the ACLs.
5. While the ACL concept is implemented in a number of other UNIX systems, I have had problems with interoperability between HP-UX and AIX (IBM's UNIX) when either was using ACLs. Check with the vendor for the latest patches if you encounter problems.
6. Remember that the use of ACLs changes the default way Group level permissions are checked. If you grant or revoke a permission for a user by explicitly listing the user in the ACL, the other permissions are ignored. For example, if user Ed owns a file and grants Group 'users' read access to it, he can remove read access for user Lisa, even if Lisa is in the group 'users'. This gets really interesting when you are trying to determine why a user who should have access to something doesn't.
7. Using *chmod* without the *-A* option removes the Access Control List for a file.

Well, that is all for this time. I hope I cleared up some confusion about group access and introduced a new concept that will make managing your system, and its users, easier. ◧

Christopher Curtin is the Team Lead for Server-side Client-Server development for Manhattan Associates. His e-mail address is

Stuck using tar?

(or fbackup, cpio, or dump?)

What a sticky mess! Standard UNIX backup utilities force you to glue on scripts to make them work right, have performance like molasses, user interfaces that are clear as pitch, and reliability that could drag your career down into a pit. It's time to kick asphalt. Load BACKUP/9000 (it takes less than 10 minutes), and automate super fast, reliable backups and restores on any networked system via its slick user interface. Let BACKUP/9000 back up your Oracle databases hot, track tapes and files, manage media, schedule backups, etc. Don't get stuck - get something faster, easier, and more reliable. Contact us for a free demo today, before things get really messy.

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CIRCLE 72 ON READER SERVICE CARD

by David L. Totsch

Gunslinger

I AM NO PROPONENT of euthanasia, but, on occasion, a system administrator has to strap on a side-arm, hunt down an unruly varmint, and stop it dead in its tracks. These critters can be a tame process some user has unleashed unintentionally or something as wild as a system process suddenly gone loco, consuming every CPU cycle and disk block in its path. Let's talk about how to put down an unruly beast quickly and carefully and leave honing our tracking skills for later.

Of course, the system administrator's weapon of choice is not manufactured by Colt—it is the standard UNIX *kill(1)* command. Much more than a simple six-shooter, it has 34 different shots that it can make (some of 'em blanks). Unlike cartridges, *kill's* signals strike with varying force. To understand these signals and their impact, we need to read some documentation (probably an unusual activity for the common gunslinger). You can start with reading the man page for *signal(5)*. We can also examine */usr/include/sys/signal.h*. Here we find the name to number mapping and a short description of each signal (scan for "*/* Signal numbers */*"). As a useful reminder as to what signals are available we have `kill -v`, which prints out a list of signal names.

When you become a gunslinger, er, system administrator, you are usually instructed to "shoot by the numbers." That works well until you realize that there is a better technique than "kill minus nine works every time" (and there is some risk associated with such a brute force methodology). Using the names, rather than the numbers, instills some respect for what is happening and reminds us of the finer aspects of the command. For example, have you ever had a process hang inexplicably? Did you know that sending it a SIGABRT would cause a core dump to be created? The folks you have been corresponding with about the hang should be able to analyze the core dump and possibly figure out why the process is hanging. You will be killing it forever if you do not find out what is causing the problem.

Before you draw a bead on that big bad process to deliver a powerful "sure kill," you might try a lower caliber. Sometimes just interrupting an outlaw in the midst of a crime will foil the attempt. Give 'em a SIGINT ("Hey, you!"). Other times, a bandit is nothing more than a well-meaning citizen that ain't thinkin' straight and you merely need to ask 'em to stop : SIGTERM ("Hey, you over there, would you please stop—that ain't nice"). If none of that works, try a SIGQUIT ("Stop, before I have to get rough with ya"). Interactive processes may be bullet-proofed against SIGQUIT during important tasks, though. Just be sure to try something else before you pull out the trusty old SIGKILL.

And why should SIGKILL be last? Trusty and loyal as it may be, it instructs UNIX to ignore the process to death. Don't give it any processing time, don't finish any I/O requests for the process, and when it gets processing time, finish it off. But there is a problem here. When a process asks for I/O, the kernel will send it off for a nap to wait until the I/O is complete, at which time the kernel will wake the process to handle the I/O. If the process is off passing time waiting for I/O when it is killed, the I/O will never happen. Therefore, the process will never be awakened because the I/O finished. If it never wakes up for the completed I/O, it will never get processor time, which means that it will never be buried. Yup, the living dead; a zombie. And once you have a zombie hanging around, you

have to start a whole new story, because zombies do not generally fit in the Western genre.

Well, now that those of you who faithfully watch John Wayne and enjoy reruns of Bonanza are completely disgusted, I will stop.

But not before I admit that this was inspired by one of my youthful favorites: Gunsmoke. There is one thing that none of the good guys could do that *kill(1)* can: shoot everyone wearing a black hat with one shot (take a look at "process groups" under the *ps(1)* and *kill(1)* commands). ◧

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Virtual Web Hosting

by Kartik Subbarao

ILLUSTRATION BY MICHAEL EHRHARDT

Virtual Web hosting is the process of physically locating multiple independent Web sites on a single host. In this article, we'll look at two different ways of Web hosting and how to implement them with the Netscape and Apache Web servers. Most of the configuration discussed will be directly applicable to all implementations of UNIX, but we will specifically cover setting up multiple IP addresses on HP-UX.

Virtual Web hosting is particularly important to Web hosting services. If virtual Web hosting were not available, they would be forced to make an unpleasant trade-off between customer satisfaction and cost. On the one hand, in order to distinguish between multiple sites on a single system, the clients would have to deal with extra long URLs that included port numbers or path names such as *http://www.server.com:9000*. On the other hand, if they chose to satisfy customer needs for simple, recognizable URLs like *http://www.foo.com*, every new Web site would require the purchase of additional hardware (networking cards, or even additional systems).

Fortunately, with virtual Web hosting, we can avoid that trade-off. In fact, we get the best of both worlds. Web hosting services can support the largest number of customers in the most cost-effective manner, while the implementation remains completely transparent to customers.

As with anything "virtual," there are different ways to implement hosting. Let's look at the two main options: using enhancements to HTTP (HyperText Transfer Protocol) that directly support Web hosting and, alternatively, assigning multiple IP addresses to a single network interface.

HTTP 1.1

If *www.foo.com* and *www.bar.com* are to be hosted on a single machine with only one IP address, there must be some other way to tell them apart. Although the URLs will be textually different—*http://www.foo.com* vs. *http://www.bar.com*—since they both map to the same IP address, the browser ends up connecting to the same HTTP server in both cases. Version 1.1 of HTTP resolves this ambiguity by having the Web browser send the host portion of the URL as an additional field in the request. That way, the server can act on this information, and provide the appropriate data back to the browser. For example, here's the request that an HTTP 1.1 compliant browser could send for *http://www.foo.com/products.html*.

```
GET /products.html HTTP/1.1
Host: www.foo.com
```

The server will now know to retrieve *products.html* from the document root of the *www.foo.com* server that it is hosting on the system.

As it turns out, Netscape Navigator has sent the **Host** field since Version 2.0. Microsoft's Internet Explorer 3.0 sends it as well. Netscape's Enterprise Server and the Apache server recognize the **Host** field. If you know that all of your client browsers will support it, you can safely choose this method. This is not currently a realistic assumption if your client base is the Internet community at large.

Multiple IP Addresses

If you don't know whether browsers will send the **Host** field, you can distinguish between different Web sites on a single system by assigning multiple, unique IP addresses to your existing network interface. Even if you knew all your clients were HTTP 1.1 compliant, you still might want to assign individual sites their own IP addresses. For instance, if you're running a Web-hosting service, you might want to characterize traffic for individual customers. Web server logs do not provide detailed statistics such as the number of

TABLE 1 *Patch Numbers as of 4/97*

HP-UX Version	ifalias Patch	ARPA Transport Patch
10.01	PHNE_7107	s700–PHNE_9102
		s800–PHNE_9103
10.10	PHNE_7108	s700–PHNE_9104
		s800–PHNE_9105
10.20	PHNE_7109	s700–PHNE_9098
		s800–PHNE_9099

bytes transferred. With independent IP addresses, lower-level components of the system, such as routers and network management tools, can be aware of the impact of individual sites on the network.

Netscape's Enterprise Server 2.01 requires running a separate process of the Web server for each individual IP address. The Apache server can also run separate processes bound to different IP addresses, but it supports requests to multiple IP addresses in the context of a single process as well. Fewer processes obviously take up fewer system resources. However, just as with the decision to implement separate IP addresses, you may well want to run separate processes for each Web site. Giving each Web site its own process allows you to characterize the impact of each process individually on total system performance. Software like HP's Process Resource Manager could then be used to further manage scheduling.

Another reason why you might choose separate processes is security. In the case of a Web-hosting service, if you allow customers to log in and manage their own Web sites on your system, you will want to ensure that they can modify only their own configuration and content. This would naturally dictate a separate instance of the Web server for each customer, with appropriately configured permissions. Another fringe benefit to this approach is that migration of individual Web sites is easier.

Next, we'll look at how to set up multiple IP addresses on HP-UX. For other versions of UNIX, this functionality is typically available in the *ifconfig* command. Please see your vendor's documentation for detailed information.

HP-UX *ifalias* Command

To configure multiple IP addresses on HP-UX 10.x, you'll need the *ifalias* command, available in a patch. Be sure also to install the most recent ARPA transport cumulative patch. (This is because there is a bug in the 10.x kernel networking code that fails to distinguish between sockets bound to different IP addresses listening at the same port.) *Table 1* contains patch information for different versions of HP-UX.

I *strongly* recommend that you upgrade to a recent version of HP-UX. Version 10.20 has networking enhancements that improve the performance of Web servers.

Here is an example of how you might use *ifalias* to add the IP address 1.2.3.5 to a system:

```
% ifalias lan0 add 1.2.3.5
```

After running *ifalias*, you can verify the newly assigned IP addresses with *netstat*.

```
% netstat -in
```

The *ifalias* command (actually, the *SIOCADDIFADDR ioctl()* in the kernel) does *not* allow the addition of IP addresses that are outside the subnet as defined by the primary IP address and subnet mask. The reason for this restriction is the nature of IP routing. For example, for the IP subnet 1.2.3 with subnet mask 255.255.255.0, only IP addresses that start with 1.2.3 are recognized: 1.2.3.1, 1.2.3.2, and so on. If you were suddenly to introduce a system with a foreign IP address on that network, e.g., 9.8.7.6 and subnet mask 255.255.255.0, it would not be able to talk to anyone; nor would anyone know how to talk to it. The router on the 1.2.3 network would forward packets only to and from hosts on the 1.2.3 network. (It *is* possible to configure a router explicitly to handle multiple IP subnets within a single physical network, but this is not the norm.)

This restriction becomes an issue if you want to test virtual Web hosting on your workstation and all available IP addresses in your subnet are already in use. What do you do in that case? Well, here's a clever trick you can use to get around this problem, without having to resort to hijacking someone else's IP address. All implementations of TCP/IP recognize 127.0.0.1 as another IP address referring to the loopback interface of the local system (called *localhost* **or** *loopback*). So instead of using *ifalias* to configure a new IP

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address, just treat 127.0.0.1 as an additional, unique IP address already bound to your network interface!

Now, let's go through the configuration of a virtual Web host from start to finish.

Configuration

We will be working with the machine canonically named *www.foo.com*, IP address 19.97.2.10. We would like to host *www.bar.com* on the same box. In the cases in which *www.bar.com* has a separate IP address, that IP address is 19.97.2.11. The document root directory for *www.bar.com* is */usr/local/htdocs/bar*.

DNS

If we wanted to configure *www.bar.com* with a different IP address, we would add this record to the appropriate name server db file:

```
www.bar.com.    IN    A    19.97.2.11
```

We would also add the corresponding **PTR** record to db.19.97.2:

```
11    IN    PTR    www.bar.com.
```

This is the exact same procedure we would follow if we were adding *www.bar.com* as a new host.

If we want to configure *www.bar.com* with the same IP address as *www.foo.com*, we have two choices. We could add an **A** record for *www.bar.com*, with the IP address 19.97.2.10. It makes more sense in this context, though, to add a **CNAME** record (alias) pointing to *www.foo.com*:

```
www.bar.com.    IN    CNAME    www.foo.com.
```

In this case, we would not add any **PTR** records. Reverse lookups would return the canonical name of the system, *www.foo.com*.

Now that we've updated DNS, we can go ahead and configure the Web server of our choice.

Netscape Enterprise Server

The Netscape server products can be administered very flexibly. Administration can be done either through a Web browser or by manually editing configuration files. Manually edited changes are reflected in the administration server and vice versa.

First, let's cover the case in which there's only one IP address and the **Host** field is being relied on to disambiguate requests. Netscape calls this option *Software Virtual Servers*.

To set up a software virtual server through the administration server:

1. Connect to your administration server from your Web browser and select your Web server
2. Click on **Content Mgmt** in the upper frame
3. Click on **Software Virtual Servers** in the lower left frame
4. Type *www.bar.com* in the **URL host** field, and *bar/index.html* in the **Home page** field
5. Click **OK**; then click **Save and Apply** to save and apply the changes.

As a result of doing this, the following lines will be added to the *obj.conf* server configuration file. Had you preferred, you could have bypassed the GUI and added these lines manually:

```
<Client urlhost="www.bar.com">
NameTrans fn="home-page" path="bar/index.html"
</Client>
```

The path specified here can be either absolute or relative to the document root.

Netscape has a technical note on Software Virtual Servers at

http://help.netscape.com/kb/server/960804-21.html

As mentioned previously, to install the Netscape server at a different IP address, you need to create a separate instance of the server. But before you do that, you must make sure that any already-configured Web server is bound to its *own* IP address alone. This is because by default, Web servers are configured to bind *all* local IP addresses. So if you took no other action, your first Web server would respond to requests to all other servers. To set this up in the administration server, select your Web server, and click on **Network Settings** in the lower left frame. Type in the specific IP address—in our case, 19.97.2.10—in the **Bind To Address** field. Or, you can add the following line to *magnus.conf*:

```
Address 19.97.2.10
```

With that settled, you're ready to install a new instance of the Netscape server:

1. Select **Install a New Netscape Enterprise Server**
2. Fill in **Server Name** with *www.bar.com*
3. Fill in **Bind address** as 19.97.2.11
4. Fill in **Server Identifier** with *bar*
5. Fill in the **Document Root** field with */usr/local/htdocs/bar*

If, instead, you want to create another instance of the Web server from the command line, replicate the current configuration files in a new, parallel hierarchy, then modify the files as appropriate. The administration server will automatically recognize the new instance. For example:

```
% mkdir /usr/ns-home/https-bar
% cp -r /usr/ns-home/https-foo/* /usr/ns-home/https-bar
% vi /usr/ns-home/https-bar/config/*.conf
```

Apache Server

The documentation for the Apache server has detailed information on configuring virtual Web hosting:

http://www.apache.org/docs/virtual-host.html
http://www.apache.org/docs/mod/core.html#virtualhost
http://www.apache.org/docs/host.html

In the Apache server, both methods of virtual Web hosting, **Host** field and multiple IP addresses, can be handled with the same *VirtualHost* directive in *httpd.conf*:

```
<VirtualHost www.bar.com>
ServerName www.bar.com
DocumentRoot /usr/local/htdocs/bar
</VirtualHost>
```

Had we wanted to manage the different Web servers in different processes, we would do much the same thing as with the Netscape server. We would replicate the hierarchy of configuration files. And once again, we would have to make sure that each process was bound only to its designated IP address. To do that, we would add this line to the *httpd.conf* for *www.foo.com*:

```
BindAddress 19.97.2.10
```

and this line to the *httpd.conf* for *www.bar.com*:

```
BindAddress 19.97.2.11
```

Flexibility

There are other applications beyond the scenario we have used of a Web hosting service. For instance, you can advertise different host names to different target audiences and customize the information presented to them, leveraging a common content base. Virtual Web hosting gives the Webmaster a great deal of flexibility in managing Web name spaces. ◧

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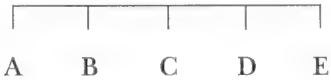
Developing a Patching Strategy for HP-UX 10.x

by Scott W. Sarisky

It seems as if we live in a reactive world. Something happens and we react to it. These scenarios can lead to stressful situations and there is no shortage of stress these days. If these situations lead to stress, it stands to reason that the opposite would lead away from stress. Therefore, the opposite of reactive is proactive. Proactive, by definition means to be in favor of or supportive of being active. In other words, take action/control of a situation before it takes control of you.

One of the proactive things you can do regarding HP-UX is to have a plan or strategy for patching your computers. If you have already made a decision to patch your system(s) proactively, you have made a step in a good direction. The next step is to determine the how, what, when, and where. In other words, you need to develop your patching strategy.

Before getting into what strategy makes sense for you, let us first consider what patching approaches can be taken. Operating system patching is much more than a simple yes or no. Yes, we patch or no, we do not patch. Consider the following diagram; at any given time, you are at some point on this line. You may be directly on one of the letters or you may fall between two letters. However, just because you are at a certain point today, don't think you will always be at that same point.



A - apply no patches
B - apply a patch for a specific problem (reactive)
C - conservatively apply patches (proactive)
D - aggressively apply patches (proactive)
E - apply every patch

A and E would probably be considered unique and special cases. B's are either truly of the mindset, "if it ain't broke, don't fix it" or they are former A's in a jam. This leaves us with C and D. As you can see, they are both in the category of proactive. Now almost everyone, either consciously or not, is at some point on this line. Furthermore, the point at which you are today may not be the point where you were a year or two ago. We tend to change in relation to circumstances.

However, for the purpose of this article, with and the idea of maximizing system up time, the proactive patching, i.e., conservative or aggressive, is what needs to be determined. Proactive patching in a broad sense means that nothing you are aware of is specifically or significantly wrong or broken. So, if we look at the two types, conservative proactive and aggressive proactive, here are some of the things we'll see.

Aggressive Proactive Patching

When your system is in a dynamic state, e.g., new or modified application systems are being introduced often or on a regular basis, the chance of running into a problem is greater. Also, when new code is introduced, it may mean configuration changes and/or an increase in system load. All of these changes have the potential of creating new scenarios that can lead to system related problems. With HP's large installed base of systems, the new problem you have just encountered already may have been experienced at another site and a fix or workaround may already be available. For these reasons, an aggressive proactive patching plan should be considered. This means new patches should be installed on a regular basis. Ideally, the aggressive approach should have a good test environment that closely resembles the production environment for testing purposes.

Illustration by Gale Patterson

Conservative Proactive Patching

When things are in a fairly static state on your system, i.e., few changes are being introduced, the chances of encountering new problems are far less as compared to the dynamic environment.

Patches should still be applied, but on a less frequent basis. Possibly, only critical patches should be applied. You may cycle through periods where aggressive makes sense and then go into a more static phase where you can take a more conservative approach.

Things to Consider When Developing Your Strategy

Developing your patching strategy for a single system is obviously much easier than for an entire enterprise. A single system can be categorized for what it does. An enterprise is made up of many systems and it is therefore more difficult to be exclusively conservative or aggressive. Therefore, you may have a mixture in your overall enterprise patching strategy.

Following are a number of ways for you to obtain HP-UX patches. Listed with each method are a few of the benefits and trade-offs.

1. HP Electronic Support Center

Anyone who has access to the Web can browse and download HP-UX patches from the following url:

http://us-support.external.hp.com

Current HP-UX patches that are in a GR (general release) state are available to be downloaded from this Web site. You should read the patch text via the browse option to determine whether you want a particular patch and that all dependencies have been met. Also, you will find installation instructions in the patch text file.

BENEFITS:

- You can download patches when you want/need them.
- You have the option to download many patches and *swcopy* them into a depot. This will allow you to install all the patches in your depot.
- This method can be much quicker as compared to waiting for a tape.

TRADE-OFF

- You must check all dependencies (found in the patch text file) for each patch that you download and install.
- Some patches can be very large in size and will take longer to download.
- Some people have Web access only through their PC, not their HP-UX box.

2. Extension Software CD-ROM

Every two months, customers with a support contract with HP receive the Extension Software CD-ROM. The CD-ROM contains patch bundles for current HP-UX operating system levels. The 10.x patch bundles can be installed on your system using *swinstall* with the *match_target=true* option. Typically, there will be three new patch bundles per release of the bimonthly CD-ROM. In other words, if the CD-ROM contains 9.04, 9.05, 10.01, 10.10 and 10.20, three of them will be new bundles. The ones that are not new will be the same bundle as on the previous copy of the CD-ROM.

BENEFITS:

- Patches are tested as a "bundle" of patches. They are installed on HP test machines.
- Interdependency logic is built into the bundle. In other words, if a patch will not install on your system and it is a dependent patch for another patch in the bundle, neither will install.
- The CD-ROM is automatically sent every other month to the customers who have a support contract with HP.
- Patches on the CD-ROM are seasoned patches.
- This is the "ease of use" method for putting patches on your system.
- These patch bundles typically contain many patches.
- You do not have to spend time doing a patch analysis.

TRADE-OFF:

- If your needs cause you to be on the leading edge of technology, you might not have the latest version of a patch.
- You have little control over what patches go on your box.
- Since there are typically many patches in the bundle, it will require more time to install and more disk space.
- Not all patches critical to your operations are included, e.g., specific subsystem patches, latest kernel patches, etc.

3. Custom Patch Manager

Custom Patch Manager is or will be available for those customers who have a support contract with HP. This method of obtaining patches requires that you, as a customer, be familiar with doing custom patch analysis. You can access Custom Patch Manager from the Web at the following url:

http://us-support.external.hp.com

You must register, via the Web, prior to using this tool. This method of obtaining patches allows you to determine what patches will be selected for your system.

BENEFITS:

- You will get the latest patches from HP.
- The customer can configure and download custom patch bundles based on a system specification file.
- CPM provides automated analysis; it reports dependent patches and patch conflicts to you.
- You are in control of what patches go on your system—you can be as aggressive or conservative as you want to be.

TRADE-OFF:

- You will need a person or persons knowledgeable about patches and the patching process.
- Patches are not tested as a unit.
- Basically, this method is a time vs. money decision.

4. Reactive Patching from the HP Response Center

Customers who have a support contract with HP can call the HP Response Center (800-633-3600) when a problem occurs. If the problem is a known problem and a patch is available, you can request that the Response Center engineer send that patch to you.

BENEFITS:

- No up front work on your part until there is a problem.
- It is your risk, but you spend time dealing with patches only when a problem occurs.

TRADE-OFF:

- Sooner or later a problem will occur. You will be duplicating your efforts each and every time a problem occurs.
- Minimum turnaround time for receiving a tape from the Response Center is one day. Normal turnaround time is two days.
- By not planning your own proactive strategy, you may very well spend more time patching on a per incidence basis.

5. Proactive Patch Analysis from HP as Part of an Ongoing Support Contract

Customers who have a support contract at the PSS (Personalized System Support) level or higher can have HP send them a custom patch bundle.

BENEFITS:

- All of the patch analysis labor is HP's—you do not need people at your site to have patching expertise.
- You will receive custom patch bundles on a regular basis as per your support contract.
- HP people doing your patch analysis typically know you and are familiar with your approach to patching.
- The custom patch bundle will contain the latest patches from HP.

TRADE-OFF:

- The higher level support contracts cost more.

6. Proactive Patch Analysis from HP on a Time and Material Basis

Customers who do not have a support contract at the PSS (Personalized System Support) level or higher can have HP send them a custom patch bundle. This is part of HP's consulting business and the work is performed typically on a time and material basis. The phone number for the time and material group is (888) 376-4737.

BENEFITS:

- All of the patch analysis labor is HP's—you do not need people at your site to have patching expertise.
- You purchase this service only when you need it.
- The custom patch bundle will contain the latest patches from HP.

TRADE-OFF:

- The cost of a time and material patch analysis is more than what a patch analysis would cost as part of an ongoing PSS or higher support contract.
- Turn around time is determined by resources available at the time.

7. Do Nothing

This option is basically the same as patching on a reactive basis. Your plan may be to do nothing, and that works until something does go wrong.

Okay, now you are aware of conservative and aggressive approaches and benefits vs. trade-offs on various methods of obtaining patches. This information will help you decide

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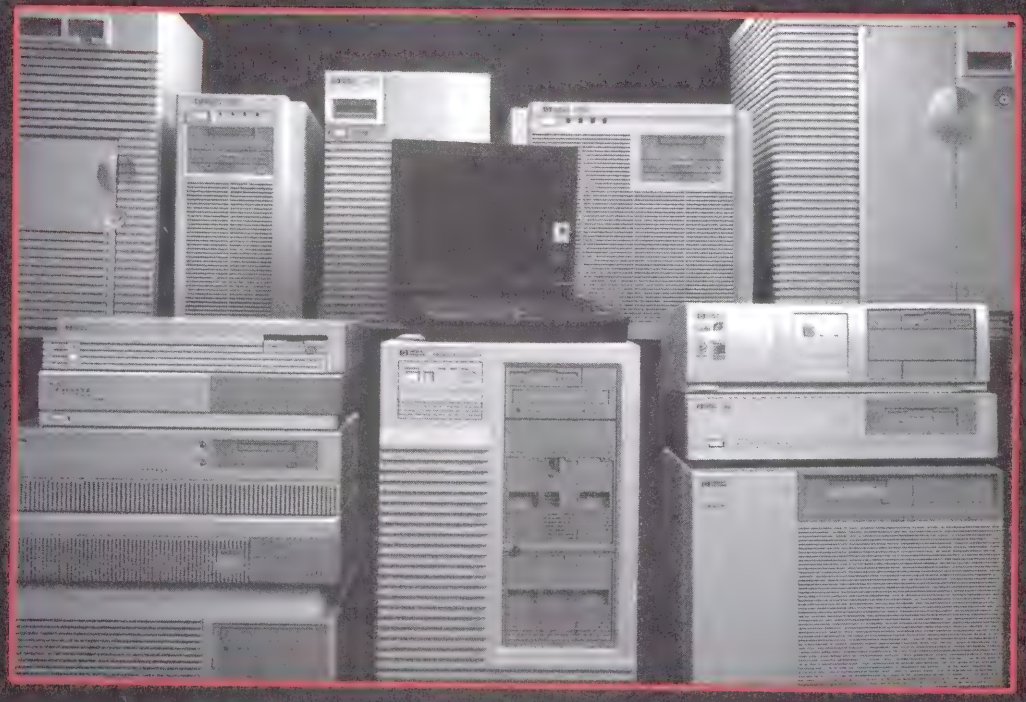

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what strategy best fits your environment. It is very possible that your strategy could be a composite of quite a few of these pieces. For instance, you may have some systems for which it makes sense to use the Software Extension CD-ROM solution and also other more critical systems for which CPM or custom patch bundles from HP make sense. Another aspect of your strategy you must consider is frequency. A decision will need to be made on how often patches should be applied. Again, this too could vary from system to system.

One of the new concepts of HP-UX 10.x is using a depot to store your patches. A depot is basically a directory that holds software products and all of the information required for *swinstall* to install from. In this case, the software products are the patches. You could create a depot for each version of HP-UX that you utilize. Patches can be added or removed from this depot. The command to add patches to your depot is *swcopy* and the command to remove patches from your depot is *swremove*, with the *-d* option. Therefore, you can manage your patch depot for the entire environment instead of looking at each machine individually.

The depot can be set up on any 10.x system, and providing it is on the network, patches can be installed across the network. Currently, to do this you would execute *swinstall* on the system that you are applying patches to and point back over the network to the system where the depot resides. One caveat to be aware of is that when you add a patch to the depot, you must remove any patches already in your depot that the new patch supersedes. The manual way to do this is to check the patch text file of the new patch and compare the patches that it supersedes with the patches currently in your depot. The automated way to do this is with the *cleanup* command using the *-d* option. To do this, You must have the latest version of the *cleanup* command, which is in patch PHCO_12140.

Review of Software Distributor

The following is a review of SD (Software Distributor). First, there is a new way to handle or manage not only patches, but all software and subsystems as well. The new utility is called SD-UX, which is an acronym for Software Distributor for HP-UX. There are a number of new commands in SD. Following are some of the new SD commands that are relevant to patching.

COMMAND	PURPOSE
swinstall	install software products and patches
swlist	display information about installed products and patches
swcopy	copy software products or patches into a depot
swremove	remove software products or patches

Another term that is new with 10.x is *depot*. A depot is a directory location that contains software for installation. When you get a patch from the Web and unshar it, you will have a *.text* and a *.depot* file. The *.depot* file is where the binaries are for that particular patch.

It is highly recommended that you become familiar with the operation of the product installation tool, SD, before attempting patch installation. The relevant document is "Managing HP-UX Software with SD-UX," part number B2355-90054. Also, the best way to learn after becoming familiar with SD is to practice. This can be accomplished either on a crash and burn system if you have that option or by installing an "easy" patch and following it through the process.

swinstall

The SD command to install patches is the *swinstall* command. There are many options to this command. By definition, this command is for installing and configuring software products at 10.x. For the purpose of SD-UX, patches are considered software products at 10.x. This command can be run in three different "styles." It can be run as a stand-alone command from the command line, or it can be run as a GUI (graphical user interface) or TUI (terminal user interface). The GUI and TUI are interactive. *swinstall* runs other scripts as part of the process to install a patch. The scripts that run are:

SCRIPT	PURPOSE
checkinstall	Tests for hardware and software configurations that might prevent install.
preinstall	Cleans up from predecessor file set; it removes obsolete files, kills daemons owned by file set.
postinstall	Enhances kernel functionality; adds drivers, modifies kernel *parameters.*
configure	Creates any special files, performs conditional moves of delivered files, modifies system configuration files, and warns/informs administrator as necessary.

So, as you can see, *swinstall* does a number of things in the process of installing patches. As an example, if you pulled a patch from the Web, the command to install on a 10.x system would look like:

```
swinstall -x autoreboot=true     -x match_target=true
          -s /tmp/PHKL_6686.depot
```

This would be typed in at the prompt.

The "-x" is for option parameters, and in this case we have told SD that autoreboot is true, which means the system will automatically be rebooted. Next, we told SD match_target=true; this tells SD to install software (patch in this case) only where the file set(s) required are already on the system. Last, the "-s" option tells SD where to find the software (patches) to be installed.

As with all of the SD commands, these are extremely verbose in their logging of any actions performed. All output from SD commands is logged in the appropriate file in the */var/adm/sw* directory. In this case the log file would be */var/adm/sw/swinstall.log*.

swlist

The *swlist* command displays information about software products that are currently on your system. Patches are considered software products at 10.x, at least for the purposes of SD-UX. Again, there are many aspects and options to this command. For the purpose of patching, following is the *swlist* command that you will primarily use in determining what patches are on your system.

```
swlist -l product PH\*
```

swcopy

The *swcopy* command will copy software products to a directory depot. In other words, if you want to move a patch and create a depot for it, you use this command. If, for instance, you were pulling several patches from the Web and you wanted to install all of then at the same time, you could put them all in one depot with the *swcopy* command. If you have three patches in */tmp* and you want to put them in one depot, you can do the following:

```
swcopy -s /tmp/PHCO_1234.depot PHCO_1234 @/tmp/abc.depot
swcopy -s /tmp/PHKL_5678.depot PHKL_5678 @/tmp/abc.depot
swcopy -s /tmp/PHSS_9911.depot PHSS_9911 @/tmp/abc.depot
```

You would now have all three patches in one depot. *swcopy* can also be executed as a GUI/TUI.

swremove

The *swremove* command does just the opposite of *swinstall*—it removes software products. This command can be run in three different "styles." It can be run as a stand-alone command from the command line, or it can be run as a GUI (graphical user interface) or TUI (terminal user interface). The GUI and TUI are interactive. *swremove* runs other scripts as part of the process to remove a patch. The scripts that run are:

SCRIPT	PURPOSE
checkremove	Checks for existence or absence of files, hardware/system/kernel configuration.
unconfigure	Undoes what the configure script (swinstall) does, kills processes from previous file set, removes client-specific files, such as log files.
preremove	Moves or removes files and directories under shared directories; severs symbolic links from a shared directory to another shared directory.
postremove	Removes newly emptied directories that are the exclusive property of the file set and reside in a shared directory; removes the file set's log files.

For example, if PHCO_1234 needs to be removed from the system,

the following command will do it:

```
swremove PHCO_1234
```

As long as the NOSAVE option was not used when PHCO_1234 was installed, the system will be returned to the state it was in prior to installing PHCO_1234. If the NOSAVE option was used, the attempt to remove the patch would fail.

If you are at HP-UX 10.10 or below, *swremove* will not regen the kernel or reboot the box automatically if you are removing a patch that required a reboot when it was first installed. If you are at HP-UX 10.20, the default when removing a patch that required a reboot when installed is to regen the kernel and reboot the system automatically. ◧

Scott Sarisky is a Remote Account Support Engineer with Hewlett-Packard in Atlanta, Ga. He assists customers in setting up their patching strategies and also by providing custom patch analyses .

Software review: FacetWin

by Greg Cagle

The subject of this review is FacetWin. FacetWin is a Windows-to-UNIX connectivity solution provided by FacetCorp. Another product from FacetCorp is FacetTerm, which provides multisession capability to "dumb terminals" and PC terminal emulation clients on UNIX machines. FacetWin is supported on the following UNIX platforms: SCO Open Server 5, SCO UNIX, UNIXWare, AIX, SunOS, Solaris, HP-UX, Digital UNIX, Irix, DYNIX, and several other obscure UNIX variants. On the client side, FacetWin supports Windows 95 and NT clients. Server testing was conducted on an HP 715/80 workstation, running HP-UX 10.20 with some patches. Client testing was conducted on an HP OmniBook 800CT notebook, running NT 4.0 Service Pack 1. The FacetWin software appeared to be Version 1.1, CD-ROM 251.

Features

File and Print Services

The file and print services provided by this package are essentially identical to those provided by the freeware package Samba. This amounts to SMB (Server Message Block) file and print services, allowing file systems and printers hosted on a UNIX server to be visible to and usable by SMB clients. SMB clients exist for many different systems but are primarily Windows-based machines.

The evaluation package I received included a cute little button, reading "NFS" with a red slash through it (*Figure 1*). The included press release positions the product as differing from "existing connectivity alternatives" in not requiring PCs to run NFS. I'll leave it as an exercise for the reader to decide whether or not Samba and Advanced Server/UX exist.

Terminal Emulation

The terminal emulation portion of FacetWin (*Figure 2*) is a fairly simplistic terminal package. It is more fully featured than the NT "telnet" client, but lacks power user features (such as scripting) available in Reflection 1, for example. Terminals emulated include VT525, WY60, SCOANSI, IBM 3151, and IBM 3164. There is no HP terminal emulation, which other products provide. A useful feature allows you to watch the terminal output (even for a specific string) and bring up a PC alarm. A relatively annoying feature is that the properties dialog allows you to choose between one of three equally irritating splash screens to be displayed at startup, but does *not* allow you to disable the splash screen altogether. The emulator is a 32-bit native Windows 95/NT client. According to the press release, the emulator "leverages technology built into FacetTerm and HP-UX's Terminal Session Manager."

PC Backup and Restore

This feature allows the central UNIX server to back up and restore files to and from networked PCs. This may or may not be a good idea based on the local

Illustration by Gale Patterson

environment and whether centralized simplistic backup is appropriate. The PC drives to be backed up must be marked shared, and cannot be marked read-only if you expect to do incremental backups. If the PC shared drives have password security protection, a rather large security hole exists in that the passwords are required to be passed in the clear from the UNIX server across the network. The backup is driven from a command line program on the UNIX server called *fct_client* that generates SMB requests. This is a good thing if you want to automate backups on the UNIX server for many PC clients, but the interface is typical UNIX (somewhat cryptic, see *Figure 3*) and is not as friendly as a point-and-click interface. The man page actually compares the user interface to the *ftp* program, and it's a valid comparison! Interestingly enough, the man page for *smbclient* (part of Samba) also compares its interface to *ftp*. And it's roughly similar in functionality. Hmmm. Remember also that if you automate the backups with cron in a script, the PC share passwords will be required to be intact on each command line, which is a security issue. I was unable to get this to work on my NT machine; the documentation on how to share PC drives is Windows 95 specific and I couldn't figure out how to match them on my NT machine.

The functionality provided here does not really compare to dedicated network backup packages, but it's a lot cheaper.

FIGURE 1

FIGURE 2

Modem Server

This feature allows PCs to share a modem bank connected to a UNIX server. The current release of FacetWin, however, allows only users of the FacetWin terminal emulator to share the modems, which limits things pretty significantly. According to the FacetWin documentation, future releases of FacetWin will support a communications driver to allow other software to access the modems. I did not test this feature.

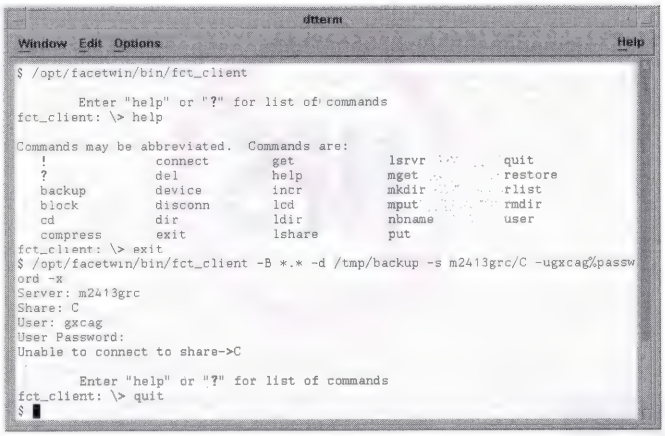
E-mail Server

The FacetWin "mail server" is essentially a POP3 server. Comparable functionality is available in many places on the Internet, such as the Eudora site or the HP-UX Porting Center (*http://hpux.csc.liv.ac.uk/*). I installed this and it appears to work OK. Note that it logs *every* login entry to *syslog*, and there doesn't appear to be a way to turn it off.

Remote Access Support

This allows remote PCs that use dial-up networking and PPP to access FacetWin features as well as the entire network via the UNIX server. All this really means is that you have to set up PPP between the UNIX server and the PC, and the FacetWin functionality will still work fine. Not too surprising, I suppose.

FIGURE 3



Features Not Provided

FacetWin does *not* provide connectivity features that users are likely to already have: mail client, Web browser, TCP/IP stack, or FTP client.

At-a-Glance

FacetWin

Facet Corp, A Division of
Structured Software Solutions, Inc.
4031 West Plano Parkway
Plano, Texas 75093-5627
e-mail: info@facetcorp.com
Phone: 800.235.9901
Fax: 800.982.9901
http://www.facetcorp.com/

Pricing

Evaluation copies are free. Single user pricing is $195, multiple user pricing scales to $125 at 100+ users. Annual Maintenance is $60 for a single user, scaling to $18 for 100+ users. Additional copies of the FacetWin manual are $20/copy.

Installation

The FacetWin documentation claims that the installation on the UNIX server should take "10 to 20 minutes," and can be accomplished by a "novice system administrator." I suppose that's possible on a clean system that's not running NIS or doesn't have similar services (such as Samba) already configured.

My initial shot at installation failed, primarily because I had Samba installed and running and some connections to the server were outstanding (I think). I eventually got it to work after I remedied that situation and stopped NIS. Perhaps my problem was that I don't consider myself a "novice." Some analysis of the installation script showed it performing the following steps:

- Identify OS revision
- Kill existing Facet daemons if running
- Select home directory for Facet software. Note that this is kept in a file called */etc/facetwindir.*
- Break apart and install the compressed distribution into the home directory. This includes the PC client software, which is available from the server for PC installation on multiple clients (assuming you've got the file server set up appropriately—the default configuration does this in a share called "FacetWinPC").
- Set up the configuration files. This includes a file called *Share*, which defines the file and print server configuration on the UNIX server, as well as *facetwin.cfg*, which controls the overall configuration of the server. This file includes the workgroup name, which can be important.
- It then runs a *binary* called *fct_instal*, which *apparently* modifies */etc/services* and */etc/inetd.conf*. Examination of the result showed that it commented out existing entries in */etc/inetd.conf* for the *netbios_ssn*, *netbios_ns*, *pop3*, and *ns* services and replaced them with Facet entries. I'm not sure what it did to */etc/services;* nothing obvious that I could see since those services all use well-known ports. Nowhere is the behavior of *fct_instal* documented.
- Then it puts startup and kill scripts in */sbin/rc2.d* and */sbin/rc1.d* to start the remote print server and WINS server. Note that these are set at run level 1 to kill them first (as K010 and K020 scripts) and at run level 2 to start them last (as S980 and S990).
- The script then attempts to rebuild the *services.byname* NIS database if it thinks the machine is running NIS. In order to determine this, it looks to see if the file */etc/yp/Makefile* exists. It does on my machine, but my machine is *not* an NIS server, so this part failed miserably. Perhaps they should look for a running process called *ypserv* to trigger this. I eventually had to kill the *ypbind* process temporarily in order

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for this step to work.

- Then it sends a SIGHUP to *inetd* to force it to reread */etc/inetd.conf*.
- Finally it installs man pages and some other stuff and exits.

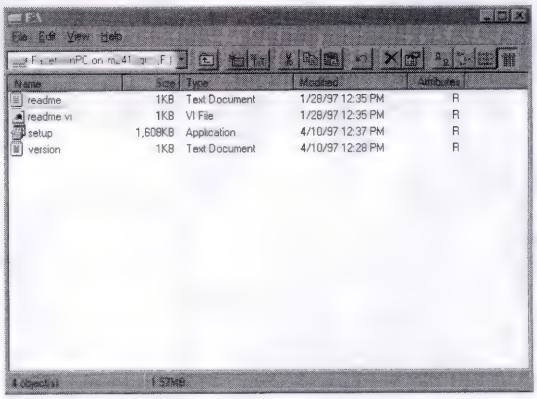
My problem with this process is that it makes fairly significant modifications to some critical OS files and directories without any up-front documentation. A log file *is* provided and the modifications were delineated clearly so I could more or less follow what had just occurred. But I would have preferred greatly to have this process described in the documentation; this would have allowed me to prepare the system more appropriately and avoid some of the problems I encountered.

Installation on the PC side is fairly straightforward; you can either install it from the CD or from the shared file system on the UNIX server (*Figure 4*). It uses the familiar "InstallShield wizard." Note that on an NT system you *must* be logged in as "Administrator." Note also that the default directory for installation is *C:\FacetWin*; on my NT machine a better choice would have been *C:\Program Files\FacetWin*.

Once the installation was complete, I was unable to see the UNIX server on the PC. The user manual spends a fair amount of time discussing potential networking issues (for Windows 95 systems only), but I knew the machines were networked OK because I had been using Samba and other network-dependent software successfully.

After some digging I found a small section in the user manual that discusses NT-specific issues. It turns out that there are four different options for configuring security on the FacetWin server:

FIGURE 4



- "UNIX password." This is the default. It requires that the login and password on the PC client exactly match the login and password on the UNIX server. This will work only if your environment will allow transmission of a username/password pair in the clear on your network, and if your PC client will generate such a thing. Apparently some NT installations don't, and mine is one of them. Or I just didn't have everything lined up correctly, which is entirely possible.
- "rhost." This allows machines named in */etc/hosts.equiv* or *$HOME/.rhosts* to log in without a password. This worked fine for me.
- "NT server." This one requires you to specify the name of an NT server that will authenticate the user, using encrypted passwords. I didn't try this.
- "LANMAN" authenticates the user via DES encryption in a separate file on the server. I couldn't get this to work either. You have to generate a separate password file using a special DES tool called *fct_encrypt* and maintain a separate password file.

Once I configured the "rhost" security option, the file sharing worked fine.

Usability

I'm using the file sharing functionality to help write this review in moving files around between the two systems. It appears to work fine and actually seems to connect a bit faster than Samba. The terminal emulator seems to work just fine also. I've been using the POP3 server for a few days now and it appears to be working well. I do take issue with the positioning of the "backup function"; I suppose that it's possible to back up PCs this way, but it's also possible to back up UNIX machines using *tar*. And it's every bit as much fun.

Reliability

I did not observe any reliability issues during the test period. Everything appeared to work as advertised (once I got it working), except the backup function.

Performance

Not much to talk about here. Things seemed to perform as advertised. The

POP3 server appeared to do as well as the Eudora qpopper I had been using, and the file services appeared to perform like Samba.

Supportability

Telephone, fax, and e-mail support channels are all available. I didn't have the opportunity to use any of them.

Documentation

FacetWin comes with a 158-page user manual. Most of it is devoted to describing the terminal emulation program and setting up Windows 95 PCs. There is very little discussion of the configuration of the UNIX server or Windows NT clients. Many critical functions are barely described. The CD comes with a 35-page booklet. It essentially duplicates the installation chapter of the user manual.

Summary

Quite frankly, I'm having a hard time seeing FacetWin as anything more than some freely available technology (Samba, POP3, etc.) with a terminal emulator and a fairly limited level of integration. I can't help thinking it's more foam than beer, but the pricing is in line with that. ◧

Greg Cagle is a technical consultant with HP's Professional Services Organization, specializing in HP-UX and workstations. In his spare time he is a member of the Executive Committee of InterWorks, the Technical Users Forum of Interex. He can be reached at (503)598-8205 or gregc@hpupora.nsr.hp.com.

Windows NT

by Bob Combs

Synchronization Objects

IT'S HARD TO IMAGINE constructing a subsystem without process synchronization. It is used whether the subsystem consists of multiple cooperative programs or a multithreaded program. As the name implies, process synchronization sequences tasks among threads.

(Just for clarity, under Windows NT a thread is the basic object of execution allocated execution time. Every process has at least one thread of execution, and may have many threads. Threads in the same process execute the same code and access the same virtual memory and global variables.)

What types of synchronization mechanisms might one wish to perform? Well, the simplest one would be to have thread A signal thread B that some task is finished or some event has occurred. Let's call this the "single event" mechanism.

A thread could wait for any of several events to occur, in which case it would be a "multiple event" mechanism.

When many threads share one resource, and only one thread is allowed access at a time, I'll call this synchronization mechanism "one-at-a-time" access.

A related version of the one-at-a-time mechanism is the "several-at-a-time" access. In this mechanism a finite number of threads are allowed to access the resource at the same time. This mechanism allows up to some number of threads to have access, but no more than that number. When more than the limit request access, those beyond the limit are held off until the threads with access release their access.

A synchronization object or mechanism under Windows NT conveys an event occurrence but does not convey other information. Other objects for inter-process communication (IPC) do transfer information, but that's a subject for a future column.

Let's compare how HP-UX and NT might effect each of the synchronization mechanisms listed above.

Single Event

If the indication is from a single program to another single program, HP-UX might use *signals*. The basic

LISTING 1 *Creating and Signaling an Event*

```
HANDLE hEvent;
void myRoutine(void) {
     // create an auto-reset event named Event1
     hEvent=CreateEvent(NULL, FALSE, FALSE, "Event1");
     ...
     // do something
     ...
     // signal the event
     SetEvent(hEvent);
}
```

limitation of *signals* is that only one program can receive the event. Therefore *shared memory* or file locks are often used to communicate an event occurrence if more than one program is listening.

Windows NT has both *signals* and *shared memory* constructs, but NT has an *event* object specifically for this type of synchronization. The *event* object can be opened by one or more threads that may then wait for it to be signaled. When it is signaled, all waiting threads are resumed. Threads use either the `CreateEvent` or `OpenEvent` call to get the *event* object handle, and the `WaitForSingleObject` call to wait for the *event* to become signaled.

There are two types of *events:* manual-reset and auto-reset. A manual-reset *event* remains signaled (set) after it has been set until specifically reset by the `ResetEvent` call. The auto-reset *event* resets after the waiting threads are released. An event may be signaled either by the `SetEvent` or `PulseEvent` call. *Listing 1* shows a thread creating and signaling an *event* object. *Listing 2* shows a thread waiting for the signaled *event* object.

LISTING 2 *Waiting for an Event Object*

```
void weWait(void) {
     DWORD dwEvent;
HANDLE hEvent;
// look up the Event1's object handle
hEvent=OpenEvent(EVENT_ALL_ACCESS, FALSE, "Event1");
// wait for it to be signaled
dwEvent=WaitForSingleObject(hEvent, INFINITE);
}
```

LISTING 3 *Waiting for Multiple Objects*

```
#define nEvents 5
void waitMany(void) {
     DWORD dwEvent;
HANDLE hEvents[nEvents];
// look up the object handles
for (i=0; i < nEvents; i++) {
hEvents[i]=OpenEvent(EVENT_ALL_ACCESS, FALSE, szNames[i]);
}
// wait for signal(s)
dwEvent=WaitForMultipleObjects(nEvents, hEvents, FALSE, INFINITE);
}
```

Multiple Event

HP-UX might again use shared memory to wait for multiple events. It's also possible that a daemon would be added to monitor the multiple events and signal the waiting process when any have occurred.

Windows NT again uses events, but in this case the waiting thread uses the `WaitForMultipleObjects` call. The call takes an array of handles and waits on them. A flag indicates whether to return when *any* of the objects are signaled or only when *all* have been signaled.

An example of waiting on multiple objects is shown in *Listing 3*.

One-At-A-Time Access

The UNIX *semaphore* is what HP-UX would use to restrict access to a resource to just one process at a time. The *semaphore* limit count would be set to one (1). While there are a few other ways to achieve exclusive access to the resource under UNIX, *semaphores* are about the best mechanism.

Windows NT, in addition to semaphores, has a special mutually exclusive access object designed for this common need. This special object is named for its purpose with a truncated name; it is called the *mutex*. A *mutex* signals only one thread at a time, and only when no other thread currently owns it.

Because NT has optimized the *mutex* for this particular type of synchronization mechanism, use of other objects

LISTING 4 *Using a Mutex*

```
void myRoutine(void) {
     HANDLE hMutex;
     hMutex=CreateMutex(NULL, FALSE, "Mutex1");
     if(hMutex == NULL) {
          // check for error
     }

     dwMutex=WaitForSingleObject(hMutex, INFINITE);
     if(dwMutex == WAIT_OBJECT_0) {  // do we have access?
          // yes, access resource
          ...
          ReleaseMutex(hMutex);
     }
}
```

LISTING 5 *Using a Semaphore*

```
void myRoutine(void) {
     LONG cMax=7;
HANDLE hSem;
// create unnamed semaphore
hSem=CreateSemaphore(NULL, cMax, cMax, NULL);
if(hSem == NULL) {
     // error
}
...
// wait for access to a semaphore
dwWait=WaitForSingleObject(hSem, INFINITE);
if(dwWait == WAIT_OBJECT_0) {
     // have access, do something
     ...
     // release semaphore 1 count
     ReleaseSemaphore(hSem, 1, NULL);
}
}
```

such as files, pipes, and semaphores is discouraged. The *mutex* is the proper solution here.

An example of using a *mutex* is in *Listing 4*.

Several-At-A-Time Access

Several-at-a-time access is accomplished under HP-UX by the *semaphore*. The *semaphore* is a named counter for accesses to some resource. Initially a *semaphore* is set to the value of the maximum number of accesses. As each module acquires the *semaphore*, the count is decremented. When the count reaches zero, modules are refused. As previously successful modules release the *semaphore*, the count is incremented. In this way only a specific number of modules are granted access to the resource.

Windows NT has an identical construct named the *semaphore*, although its calls and code sequence look different. This is partly because the NT *semaphore* is treated as an object (like everything else in NT). Refer to *Listing 5* for an example of using a *semaphore*.

Code Section Lock

Windows NT has a special case of the mutex type object called the *CriticalSection*, which can be used only by threads contained in the same process. It is a faster more efficient version of the *mutex*, but limited to use by threads within a process. Its primary purpose is to lock sections of code so only one thread at a time can be executing that section of code. A *CriticalSection* is created by invoking `InitializeCriticalSection` first, and then bracketing the code section with calls to `EnterCriticalSection` and `LeaveCriticalSection`. An example of critical sections is in *Listing 6*.

The HP-UX equivalent of this is the

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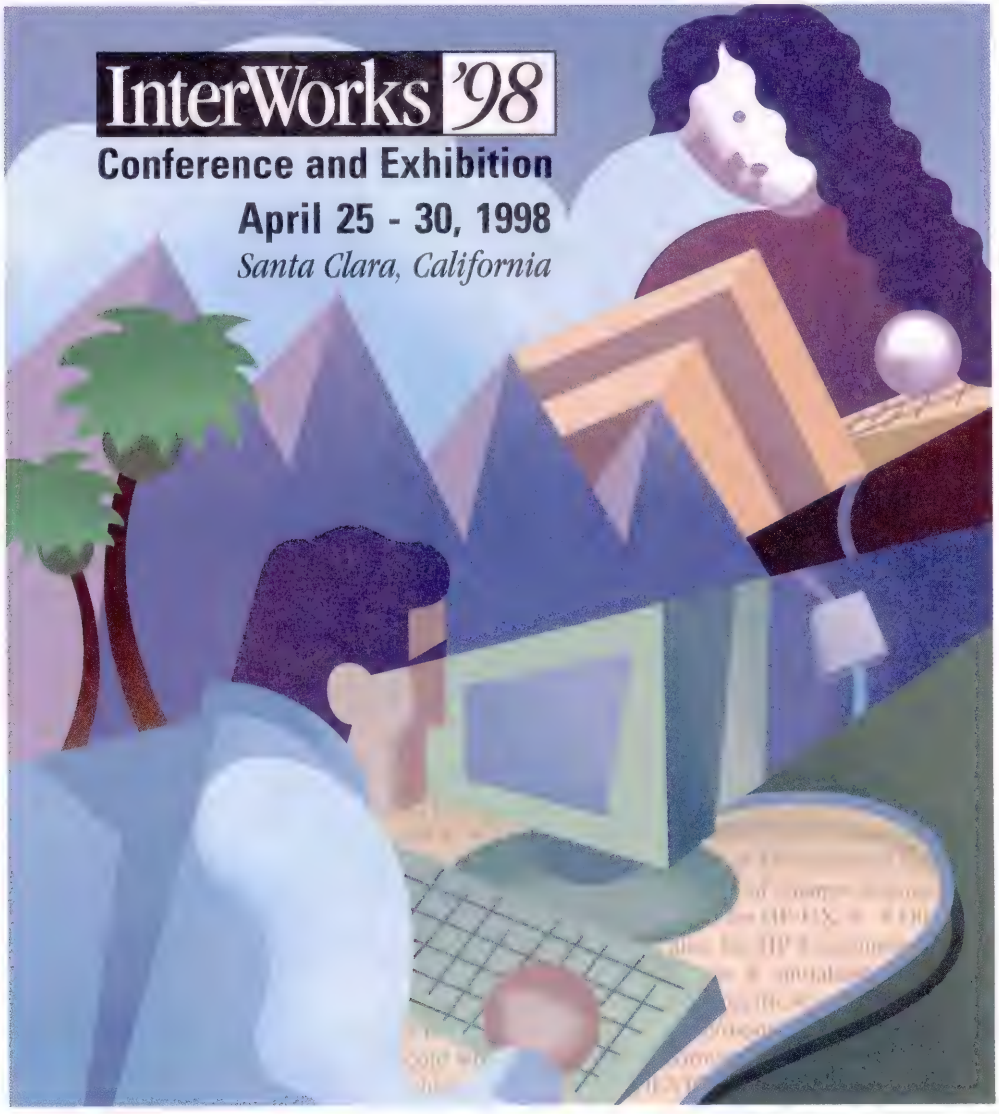

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LISTING 6 *A CriticalSection*

```
void myRoutine(void) {
      CRITICAL_SECTION critSect;
      InitializeCriticalSection(&critSect);
      try {
            EnterCriticalSection(&critSect);
            // execute code in locked section
            ...
      }
      finally {
            LeaveCriticalSection(&critSect);
}
}
```

memory-mapped semaphore or *msemaphore.*

Summary

You can further research the mechanisms I've covered here by using the Win32 SDK references. But here are a few additional notes about NT and synchronization calls.

NT's `WaitForSingleObject` can have a timeout value that will cause it to return if no object has been signaled in that period of time. The timeout value can be disabled by supplying the constant `INFINITE`, causing the call to suspend forever or until the object is signaled.

It is possible to wait for a process to finish executing by calling `WaitForSingleObject` on a process handle. Similarly it is possible to wait for a thread to finish executing by waiting on the thread handle.

NT provides a way to monitor for some change in a directory by creating a change notification handle. A change notification handle can monitor for new file names, time-stamp changes, file attribute changes, file size changes, or file security changes. The thread calls `FindLastChangeNotification` to create the desired change notification handle. Then the returned handle is used in the `WaitForSingleObject` call in the same manner as other objects. ◧

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X-Watch

by Larry Headlund

Desktop KornShell

THE RELEASE OF HP-UX 10.20 BROUGHT the Common Desktop Environment (CDE) to HP-UX. The CDE was a bold initiative of a consortium of companies, including Hewlett-Packard, Sun Microsystems, IBM, and AT&T, to share technology and present a united front towards Washington. No, not Washington, DC but the northern pole of the Wintel axis. The original CDE announcement and conference were in October of 1993; things have not worked out as planned for CDE in the fast-paced world of computers.

The method of the consortium was for its members to contribute technology, with the sum of those pieces appearing on every member's products. This would make it easier for third parties to write applications for any of the members' machines and easier for end users to move from machine to machine, since their environment would remain the same. Among the contributed pieces were VUE from HP, ToolTalk from Sun, and the Windowing Korn Shell from AT&T. This last piece became the Desktop KornShell, flowing from the interim successor to AT&T, Novell.

What is the Desktop KornShell?

The Korn Shell (ksh) has been part of HP-UX since 7.0. What makes the Desktop KornShell (dtksh) different from the pre-10.20 ksh? Dtksh is based on ksh-93, which has some new constructs, mostly for dealing with control and floating point numbers. For example, you can now set up a loop in a shell script that looks much like its C language cousin:

```
for ((i=1; i < 256; ++i))
    do
    ...
    done
```

A more profound change is that the dtksh is *extensible*. That is, you can link your own code into dtksh and add specialized functions. For example, you could add functions to access a database program, making the dtksh your 4GL. Another alternative is to use dtksh as the language "glue" that binds together components of a larger application.

The most dramatic feature of the dtksh, and what brings it within the scope of this column, is that the dtksh has functions for integrating it into the X/Motif world. You can now write Motif programs completely within the shell, using GUI prompts and displays instead of just line oriented ones. Scripting languages have a number of advantages for GUI development, including rapid development (no compile-link-execute cycle), compactness, and portability.

The Desktop KornShell is not the first scripting language for X. Looking at the free alternatives only, we have Tcl/Tk, Perl, Python, Elk, and others. Each of these languages has its fans and detractors. Dtksh is interesting because it will be available on every HP-UX machine running 10.20 or above, with no porting required, and because you probably already know ksh and can program in it. If you are already a proficient user of Tcl/Tk, Perl, or any of the other languages I mentioned, and don't like ksh as a language, the dtksh will not be so interesting for you. But if you are already proficient in ksh or have shied away from it only because of lack of extensibility or lack of a GUI interface, dtksh changes the shape of the world.

Desktop KornShell Is Not Perfect

The dtksh shares with other scripting languages some disadvantages. The first one that springs to all minds, execution

speed, is not a show stopper. On a modern computer dtksh is going to execute thousands of instructions per second. In the typical GUI application where most of the time is being spent waiting for user input, this is not an issue. If you are creating a product that will be used by many users on a single processor or is very compute intensive, the dtksh may not be for you. You could code the compute intensive portions in a more efficient language and link those parts into dtksh, of course. Even in projects where you don't envision the finished product in dtksh, it may be useful as a prototyping tool.

Another disadvantage is that there are no software engineering tools that integrate with dtksh. I don't know of any product that lets you draw Rumbaugh or Booch diagrams and spits out dtksh code. No browsers understand dtksh either.

The Desktop KornShell is not object-oriented, does not do strong type checking, is not multi-threaded, and so on. This may hamper its use in large projects. However, I am reminded of a recent statement by Larry Wall, the author of Perl, to the effect that language designers are trying to emulate George Orwell's Newspeak and create languages in which it is impossible to think evil thoughts. Is it necessary that every language be safe and appropriate for every project, at the possible cost of simplicity and flexibility?

The author of the Desktop KornShell has written some large projects in it, including a dental practice management system for his wife in the tens of thousands of lines of code. However, he thinks, and I agree, that the most popular use of dtksh will be in exactly the sort of situations where a ksh script is used now, but with the addition of GUI elements.

An Array of Buttons

Time for the sample program. I have made two choices here. Dtksh has a direct mapping to most of the familiar X and Motif C functions and a set of its own convenience functions for quick coding. I have chosen to do this first example program with only the C analog functions because I though most of my readers would be familiar with them and it would make clear the techniques of dtksh programming. The second choice was not to do a classic 'hello, world" program but instead something more complicated and certainly more useful.

The program (*Listing 1*) is called chart. The purpose is to reproduce in X a program, one of the Norton Utilities I believe, for Microsoft Windows that extends the keyboard for the whole eight-bit character set. This allows you to conveniently paste foreign characters into a document, for example.

Continued on Page 52

LISTING 1

```
1   #!/usr/dt/bin/dtksh
2   #    Widget Chart
3   #
4   #    TOPLEVEL top
5   #          |
6   #          |
7   #    TOPFORM topform
8   #          |
9   #          |
10  #          |
11  #          |
12  #          |
13  #    - WORKING working          - MENUBAR menubar
14  #          |                          |
15  #          |                          |
16  #          |                            -FILE File
17  #          |
18  #          |                    - FILEMENU filemenu
19  #          |                          |
20  #          |                          |
21  #          |                            - EXIT exit
22  #          |
23  #          |
24  #          |-RESULTS results
25  #          |      |
26  #          |      |
27  #          |      |- VALUE_LABEL value_label
28  #          |      |- VALUE value
29  #          |      |- OCTAL octal
30  #          |      |- DECIMAL decimal
31  #          |      |- DISPLAY_LABEL display_label
32  #          |
33  #          |
34  #          |- BUTTONS buttons
35  #          |      |
36  #          |      |
37  #          |      |- action buttons
38
39  XtInitialize TOPLEVEL top chart Chart "$@"
40
41  XmCreateMainWindow TOPFORM $TOPLEVEL "topform"
42
43  # Menubar creation
44  XmCreateMenuBar MENUBAR \
45                  $TOPFORM \
46                  "menubar"
47
48  XmCreateCascadeButton    FILE \
49                           $MENUBAR \
50                           "File" \
51                           mnemonic:F
52  XmCreatePulldownMenu     FILEMENU \
53                           $MENUBAR \
54                           "filemenu"
55  XmCreatePushButton EXIT \
```

LISTING 1 *Continued*

```
                    $FILEMENU "Exit" \
                    mnemonic:x

XtAddCallback $EXIT activateCallback "exit"
XtManageChildren $EXIT
XtSetValues $FILE subMenuId:$FILEMENU
XtManageChildren $FILE $FILEMEMU
XtManageChild $MENUBAR

# working area
XmCreateRowColumn  WORKING \
                    $TOPFORM  \
                    "working"
# resutls area
XmCreateRowColumn  RESULTS \
                    $WORKING  \
                    "results" \
                    orientation:XmHorizontal

XmCreateLabel      VALUE_LABEL \
            $RESULTS \
            "value_label" \
            labelString:Value

XmCreateText VALUE \
            $RESULTS \
            "value" \
            columns:1 \
            sensitive:False

XmCreateLabel      OCTAL \
            $RESULTS \
            "octal" \
            labelString:'\'0000

XmCreateLabel      DECIMAL \
            $RESULTS \
            "decimal" \
            labelString:000

XmCreateLabel      DISPLAY_LABEL \
            $RESULTS \
            "display_label" \
            labelString:` `

XtManageChildren   $VALUE_LABEL \
                    $VALUE \
                    $OCTAL \
                    $DECIMAL \
                    $DISPLAY_LABEL

# Array of buttons
XmCreateRowColumn  BUTTONS \
```

LISTING 1 *Continued*

```
                    $WORKING  \
                    "buttons" \
                    packing:XmPACK_COLUMN \
                    orientation:XmVertical \
                    numColumns:20

for ((i=1; i < 256; ++i))
        do
        decimal=$i
        octal=`printf "%o" $decimal`
        char=`echo '\0'$octal`
        label=$char
        if (($decimal < 32)) then    # control characters
                let x=$octal+100
                label=^`echo "\0"$x`
                fi
        if (($decimal == 32)) then   # space character
                label=sp
                fi
        XmCreatePushButton BUTTON $BUTTONS "$label"
        XtAddCallback  $BUTTON \
                activateCallback \
                "\
                XtSetValues $VALUE value:`echo $char`' '; \
                XmTextSetSelection $VALUE 0 1 0; \
                XtSetValues $DECIMAL labelString:$decimal;\
                XtSetValues $OCTAL labelString:'\'0$octal; \
                XtSetValues $DISPLAY_LABEL labelString:$label ';\
                "

        XtManageChild $BUTTON
        done


XtManageChildren $WORKING
XtManageChildren $RESULTS $BUTTONS
XtManageChildren $TOPFORM

XtRealizeWidget $TOPLEVEL
XtMainLoop
```

Continued From Page 51

The application consists of a set of push buttons, one for each of the 255 characters. Each button is labelled with the corresponding character. When a button is pushed, the appropriate character is put in the buffer of a text field and selected. This means it can be pasted into another application by the usual means (middle button on a three-button mouse). It is sometimes convenient to know the octal and decimal value of the character, so these are displayed in labels. I also have a label showing the last character displayed.

Line 1 invokes the dtksh. I have done a *chmod +x chart* so if the chart program is in my PATH, I just need to type chart to activate it. Lines 2 through 37 give a chart of all the widgets. I find this sort of documentation useful for anyone wishing to understand and modify a program, even myself if I haven't looked at it in a while.

Line 39, `XtInitialize TOPLEVEL top chart Chart "$@"`, is the first command of the script. You notice how it mirrors the Xt C function of the same name. A big difference is how it treats return values. Shell functions only return integer values. In a similar line of C code you would write:

```
TOPLEVEL = XtInitialize(...)
```

In the dtksh mappings of functions that must return a complex data type, such as widget creation functions, the first argument to the function is a variable in which that value will be stored. Hence `TOPLEVEL` from line 39 now contains the value of the widget, which can be accessed in the usual ksh manner as `$TOPLEVEL`. This usage is consistent for all the X and Motif functions—the first argument holds the return value.

The second thing you notice about line 39 is that arguments are separated by spaces, the shell convention, rather than commas as in C. The final argument, `"$@"`, uses some of the shell's features. This construct passes any command line arguments to the script through to Xt. For example, if I type `chart -iconic` the program obediently appears as an icon.

The next action line, line 41,

```
XmCreateMainWindow TOPFORM $TOPLEVEL "topform"
```

uses the value of `TOPLEVEL` just created. Note that `TOPFORM` is the widget returned and to use the value of `TOPLEVEL` the argument is `$TOPLEVEL`.

This all looks pretty much like an equivalent C program! However, there are no include files and no declaration of variables. I use the convention that variables are in all caps, but you are free to use your own conventions or none at all.

Line 115 uses the for loop construct I talked about at the beginning of this column. Notice I am using a loop to create 255 buttons. Imagine you were using one of those WYSIWYG screen designers. Imagine you were individually creating all 255 of those buttons, and realize the advantages of a language over a screen drawing tool for this application.

Line 118

```
octal=`printf '%o" $decimal`
```

uses the formatted print function of dtksh. Formatted printing is a relatively new feature of the KornShell; it is available on your standard ksh in HP-UX, and it will probably save a lot of shelling out to run awk scripts.

I wanted the button label to display ^L instead of the form feed character, and similarly for all the control characters, so lines 121 through 125 do the appropriate manipulation. I also wanted a literal "sp" for the table for the space character, and lines 125 through 127 take care of that.

Lines 129 to 137 illustrate the key feature of dtksh—you can use shell commands as callbacks:

```
129  XtAddCallback    $BUTTON \
130        activateCallback \
131        "\
132        XtSetValues $VALUE value:`echo $char`' '; \
133        XmTextSetSelection $VALUE 0 1 0; \
134        XtSetValues $DECIMAL labelString:$decimal;\
135        XtSetValues $OCTAL labelString:'\'0$octal; \
136        XtSetValues $DISPLAY_LABEL labelString:$label';\
137        "
```

We have already set char, decimal, octal, and label to be the appropriate values. The only non-obvious thing I am doing is on line 132 and 136. The trailing space (' ') I have appended is to take care of those cases in which the char or label comes through as a null.

The application as written has some faults. It uses a lot of screen space and it would be useful if the groups of characters could be displayed individually. The script has no online help, no real use of resources, no internationalization support and doesn't demonstrate any of the convenience functions of dtksh. These will be topics for a future column. ◧

Larry Headlund is the president of Mathematical Engineering, Inc., a UNIX and Motif development company. He has been working with commercial UNIX since 1983 and with X since 1987. He can be reached at lmh@world.std.com or at 1 617 242 7741.

Internet Goodies

by Joseph Berry

I HOPE MANY OF YOU are taking advantage of the emacs editor for your software development needs. With its extensibility, there are very few things it cannot do or be made to do. I'll discuss a number of new or upgraded modes (or modules) that have recently appeared on the Internet. In addition, some new Java software is also available that you may wish to look at. I conclude with some experimental software for the not so faint of heart.

COMP.SYS.HP.HPUX

Java WorkShop (Version 2.0)

Unfortunately, I have not invested much time in Java recently. There are many, many new tools and utilities being developed using the Java language (see muffin, below). And now it seems Sun MicroSystems is pushing its new development environment onto other platforms.

Sun has just released a "pre-release" version of its Java WorkShop by Sun Version 2.0 for HP. This is a complete toolset designed for fast and easy Java development. It incorporates the HP-UX Virtual Machine with JIT Version 1.1.2 for faster runtime performance. The following list of features was borrowed from the Web site,

http://www.hp.com/gsyinternet/hpjdk/workshop.html,

the source of the software:

- Project Manager—to organize all the files needed to create a Java program
- Visual Java—to assemble an application user interface rapidly using prebuilt graphical components
- Source Editor—to write and view Java source code easily

Build Manager—to build or rebuild a Java project with minimal recompilations à la the UNIX "make" utility

- Debugger—to graphically debug multi-threaded Java applications
- Source Browser—to view code structure and create a hypertext-linked-class hierarchy tree of Java classes used
- Project Tester—to run Java applets and applications automatically without leaving the development environment
- Portfolio Manager—to create, share, and publish your Java projects on the Intranet or Internet
- Online Documentation—to get assistance and tutorial help during development

Please note that HP is not providing support for this pre-release version. I believe that by the time you see this article in print, a new version will have been released.

jcc (v 0.2)

This package and the next one below (*toba*) are Java to C converters. In particular, this package converts Java source code (*.java* files) into C programs that, when compiled, should run over 10 times faster than Sun's Java Virtual Machine. *jcc* supports threaded code and the Java networking API. Full source code is provided. Note, however, that this is an early version of the program that, according to the author (Nik Shaylor, *nshaylor@tcp.co.uk*) is intended for evaluation purposes only. Further development is needed for it to become a mature system. It appears that *jcc* supports only JDK v 1.0.2.

You can get more information about *jcc* including the source code from

http://www.geocities.com/CapeCanaveral/Hangar/4040/.

toba (v 1.0.b6)

This package converts Java bytecodes (*.class* files) into C programs. Currently supporting only JDK v 1.0.2, *toba* is part of a larger project at the University of Arizona (my alma mater) called "Sumatra," which explores the issues surrounding efficient execution of mobile code. Information about Sumatra can be gleaned from

http://www.cs.arizona.edu/sumatra/.

The actual *toba* code is available for download from Web address *http://www.cs.arizona.edu/sumatra/toba/*. According to the *toba* documentation, it runs only under Irix 6.2, Linux 2.0, Solaris 2.5, and Windows NT 4.0. Only the Solaris implementation currently has thread and AWT support. An interesting project would be to convert this package to HP-UX (it may just be a compile). According to the authors, "Our freely available distribution includes source code for all of *toba*—we encourage outside porting efforts."

COMP.LANG.JAVA.ANNOUNCE

muffin (v 0.4)

muffin is a filtering proxy server for the World Wide Web. It filters anything sent between the Web browser and the server. This includes HTTP headers and content types such as text/html and image/gif. *muffin* comes with add-on filters that are loaded at runtime. Several example filters are included, but users are encouraged to write their own using the provided ReplyFilter, RequestFilter, and ContentFilter API.

This all-Java software was developed by Mark Boyns (*boyns@sdsu.edu*) at San Diego State University and is available for downloading from *http://muffin.doit.org/*. Running the software requires the use of the Java Development Kit, Version 1.1 (known as JDK 1.1). If you don't already have it, download the newest version (as of this writing, it is JDK 1.1.3). The documentation mentions that the software has been tested only on Solaris, Linux, and Windows 95. I do not see any reason why it should not work on an HP-UX system. This is a current list of filters that come with muffin:

- AnimationKiller—kill GIF89a animations by either limiting the number of loops or turning them into broken images
- CookieMonster—remove HTTP Cookie headers *Cookie* and *Set-Cookie*.
- Logger—keep a log of accessed URLs
- Referrer—change the HTTP referrer header to any URL or choose from a list
- SecretAgent—change the HTTP User-Agent header to any Web browser or choose from a list
- SecretServer—change the HTTP Server header
- Snoop—view all HTTP headers
- Stats—maintain various stats about your HTTP session. Useful for calculating the exact site of a Web page

GNU.EMACS.SOURCES

cc-mode (version 5.17)

All my C software development is done via emacs using cc-mode. Packaged with emacs (Version 19.34.1) is cc-mode Version 4.282. While useful, this version is quite old. A better solution is to download the author's cc-mode directly from his site and to install that over the old copy of cc-mode.

A number of advanced features are available with cc-mode Version 5.17. Included is support not only for editing C code but also for editing C++, Java, and CORBA's IDL code. Follow the steps in the README file closely as you will also need to download and install additional emacs software to get this cc-mode to work. You may be wondering about the advantages of this cc-mode.

You can configure the software automatically to format your C code into any style you would like, including K&R C and ANSI. For example, the left brace can be under the 'if' statement or it can be on the right side of the 'if' statement. You can have reserved words colored in blue, comments colored in green, etc.

cc-mode was developed by Barry A. Warsaw (*cc-mode-help@python.org*), a Python language software developer. The software is available via anonymous ftp from *ftp.python.org* as */pub/emacs/cc-mode.tar.gz*. Once there you'll see an additional subdirectory that contains documentation in both PostScript and html format for use with your browser.

todomode (v 1.12)

Here we have yet one more emacs mode that you might want to play with. Developed by Oliver Seidel (*Oliver.Seidel@cl.cam.ac.uk*), *todomode* is a major emacs mode for editing todo list files. It does this by treating most lines in a buffer as a list of items one has to do. Included are facilities for adding new items, categorizing item, and editing and deleting items from a buffer.

The code has recently gone through a number of revisions so that by the time you look for it, *todomode* may well be past Version 1.12. Sources are available wherever the Usenet newsgroup *gnu.emacs.sources* is archived. If you have problems finding it, send me an e-mail request and I'll return you a copy of the code.

JDE (Version 1.6)

Do you want to merge Java with emacs? JDE is an emacs package that interfaces emacs to JavaSoft's Java Development Kit (JDK). The JDE provides menubar access to the JDK compiler, debugger, and API documentation. Features of the Emacs/JDK combination include:

- syntax coloring
- auto indentation
- compile error to source links
- source-level debugging
- source code browsing

JDE requires the latest version of cc-mode (see above) and *andersl-java-font-lock.el* mode (available from *http:\\www.csd.uu.se\~andersl\emacs.shtml*). JDE integrates these and other packages into one consistent interface for developing Java programs.

I believe this package was written by Paul Kinnucan (*paulk@mathworks.com*). The software is available via Web access to *http://www.oasis.leo.org/java/development/ides/00-index.html*. Browse through the page as it includes other goodies to be had.

ALT.SOURCES.D

ILU 2.0

Do you want to be at the cutting edge of a new technology? Or do you want to have some fun with a package you'll probably never use in real life? Go visit the Palo Alto Research Center (PARC) Web

page and take a look at some of their projects (*http://www.parc.xerox.com/*).

One particular project from PARC is the Inter-Language Unification System (ILU), which I became aware of through the *alt.sources.d* newsgroup. You can read about the ILU project via a Web browser pointed to *ftp://ftp.parc.xerox.com/pub/ilu/ilu.html* (don't let the 'ftp' in the address fool you; PARC's Webmaster goofed; this indeed was the correct Web URL).

To explain what ILU is, I will quote from the ILU documentation: "The Inter-Language Unification system (ILU) is a multi-language object interface system. The object interfaces provided by ILU hide implementation distinctions between different languages, between different address spaces, and between operating system types. ILU can be used to build multi-lingual object-oriented libraries ('class libraries') with well-specified language-independent interfaces. It can also be used to implement distributed systems. It can also be used to define and document interfaces between the modules of non-distributed programs. ILU interfaces can be specified in either the OMG's IDL language, or in ILU's Interface Specification Language, which allows extensions to the CORBA spec. Programming languages supported in 2.0alpha10 are ANSI C, Common Lisp, Java, and Python; rough C++ support is also present. Operating systems supported in 2.0alpha10 are all Windows platforms with Win32 and WinSock, and all UNIX platforms with BSD sockets and minimal POSIX compliance. 2.0alpha10 supports interoperability with ONC RPC services, OMG CORBA services, World Wide Web HTTP services, and XNS Courier services. 'Plug-in' extensibility is provided for RPC message formats, message transport schemes, URL schemes, accounting and authorization identity types, threading and event loop processing, and various other things. ILU is provided free for unrestricted use.

"Known bugs are listed in the README file. Despite being an alpha release, 2.0alpha10 is very stable along a number of dimensions. Principal areas still under development, and hence unstable, are: the specific APIs for security, the C++ mapping, the Java mapping, the mapping of ILU object references to various RPC protocols, the specific algorithm for automatic generation of type UID fingerprints, and the specific contents of the ILU profile in the OMG CORBA IOR." ◧

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HP-RT

by Geff Blaha

Q: I am using HP-RT revision 3.00. I am attempting to open a SWSM with the *mmap(2)* call. I understand this replaces the *shmmap(2)* function, which is a Draft 9 interface. When I attempt to use the *mmap(2)* call, I see an error:

```
mmap of A1 failed: Device doesn't exist
```

Yet, the device */dev/A1* does indeed exist. What could be wrong?

A: The call *mmap(2)* does not communicate with device files.

The *Application Programming In The HP-RT Environment* manual, part number B5487-90001, edition E0197, table 4-1 on page 4-37 displays comparable "Draft 9" and "POSIX.1b" interfaces. A reference is shown comparing *shmmap(2)* (Draft 9) with *mmap(2)* (POSIX.1b). This is generally true, except for notes 1, 2, and 3, listed on page 4-37, as well as the following:

The POSIX.1b *mmap(2)* call does not support HP-RT device files. Thus, mapping of System Wide Shared Memory (SWSM) cannot be accomplished with *mmap(2)*; *shmmap(2)* can be used to map a SWSM.

At some future date, support for POSIX 1003.4 Draft 9 will be removed from the HP-RT product. Most system calls included within Draft 9 also exist within the POSIX.1b interface, providing similar or identical capabilities. System calls, such as *shmmap(2)*, will be maintained within HP-RT to allow a consistent interface and access to a SWSM.

Q: When I execute a program on HP-RT with the function:

```
while (1);
```

and no subsequent executable functions, I notice the system will lock up, waiting for the program to complete execution. This occurs when I execute the program at priority 81 or higher. Why is this occurring? What can I do to obtain system response while this program is executing?

A: After the system is booted, log in on the system console. *ps -axon* reveals results similar to:

pid	ppid	pgrp	pri	text	stk	data	time	dev	user	S name
0	0	0	0	0	0	4	35.57		root	R nullpr
1	1	1	80	92	20	28	0.29		root	W /init
11	1	11	80	92	20	60	1.40		root	W /etc/unfsio
75	1	75	81	44	20	12	0.00	console	root	W /bin/syncer
78	1	78	80	108	20	36	0.01	console	root	W /etc/inetd
80	1	80	80	172	24	56	0.04	console	root	W /bin/sh
81	1	81	80	88	20	28	0.00	tty1	root	W /bin/login
82	78	82	80	120	28	32	0.01		root	W /bin/rlogind
94	80	80	80	100	32	36	0.02	console	root	C /bin/ps

7352K/0K free physical/virtual, 1608K used (in this display)

Most processes above have a priority of 80. If your "while loop" program executes

at priority 80, other processes above can still gain CPU access, via the mechanism of "quantum." Now, when the "while loop" program executes at a priority of, say, 81, it will prevent other processes at a lower priority from executing, until it is done. Since the "while loop" program will not finish without user interaction via an interrupt, the system is effectively "frozen."

To prevent this from occurring, you must increase the priorities of necessary processes to a priority high enough to prevent any freeze from occurring. Thus, for the above list of processes, increasing the priority of */bin/sh* to be the same as or higher than the "while loop" program will allow continued console access, even when the "while loop" program executes. If network access is also desired, you must also increase the priorities of */bin/rlogind* and */etc/inetd*. If you are executing a ramdisk system, you will also need to increase the priority of */etc/unfsio* for NFS access.

Also note, another method is to ensure the "while loop" program does not exceed the priorities of necessary processes, like those described above. This can be accomplished manually, or, within the program itself with *setprio(3)*.

Q: I am attempting to boot six 743rt processors from one 743i processor within a VME crate, using the VME backplane. I can successfully boot two processors after a reset and reboot of the 743i, but the other four 743rt processors fail to complete the boot process, stopping at various stages of the boot process. What could be causing this?

A: Verify the PDC revision of your 743i and 743rt processors. This can be accomplished within the Boot Console Handler (BCH) from the Main Menu, by selecting Key 5, "Firmware Information." Displayed near the top is the revision of PDC, similar to:

```
PDC Version 304.2 Release 1
```

The latest revision of PDC for the 743 processors is:

```
PDC Version 307.0 Release 3
```

This revision corrects various problems, including VME bus communications, which could be causing your boot problems. If any of your 743 processors have a PDC revision earlier than 307.0.3, you should upgrade all of them to this latest revision. Firmware upgrade kit A2636-60018 contains the latest revision of PDC for the 743 processor.

Q: Are Fast/Wide SCSI devices supported on HP-RT?

A: As of Revision HP-RT 3.01, Fast/Wide SCSI devices are supported.

Q: I have just installed Revision 3.01. I noted there were no manual updates. How do I install and configure a Fast/Wide SCSI interface and devices?

A: This information is included within the HP-RT 3.01 Release Notes. Included are excerpts below:

Constructing a Fast/Wide SCSI Disk-Based System

Related Documentation

- You need the following manuals:
  - — *Model A4268A Fast/Wide Differential SCSI Adapter Installation and Service Guide* (E0495, HP part number A4268-90600)
  - — *HP-RT System Administration Tasks* (E0197, HP part number B5487-90002)
  - — Current edition of *Managing HP-UX Software with SD-UX*
- You may also need to consult the current edition of your VMEbus computer owner's guide:
  - — *Model 743 Owners Guide*
  - — *Model 744 Owners Guide*

Configuration Requirements

- The A4268A Fast Wide Differential SCSI (FWSCSI) Adapter is supported on Model 743rt and 744rt VMEbus computers at this Release 3.01 of HP-RT. It is not supported on earlier releases of HP-RT.
- The A4268A FWSCSI Adapter is not supported on the Model 742rt.
- The boot ROM on your VMEbus computer must be Version 304.2 (Revision E) or later. Processor Dependent Code (PDC) displays the boot ROM version number when you reset your VMEbus computer. The *Model A4268A Fast/Wide*

Differential SCSI Adapter Installation and Service Guide explains how to change the boot ROM.

Note:

Do not replace the boot ROM on a Model 744. All Model 744 boot ROM revisions support the Fast/Wide SCSI adapter.

- By default, HP-RT sets the address of the FWSCSI adapter to 7, and it ignores the switch settings on the adapter card. This default is set in the *$HPRTroot/etc/conf/info/fwscsiinfo.c* file on your HP-UX host system. The section below explains how to override the default setting.
- You cannot have a SCSI device at the same address as the FWSCSI adapter.
- FWSCSI device addresses can be set in descending priority from 7 (highest priority) through 0, and then in descending priority from 15 through 8 (lowest priority). Note that in this address scheme, device address 0 has a higher priority than device address 15. From 15, the priorities of device addresses descend to device address 8 (that is, 14, 13, 12, 11, and so forth down to 8).
- Your root disk should have a higher device address than any other device on the SCSI bus. Thus, if your FWSCSI adapter is set to the default (7), you may want to set the device address of your FWSCSI root disk to 6 (the default).
- HP-RT provides character, block, and pass-through driver device files for various SCSI device addresses. (To display the list, issue the *ll* command on */dev*.) If you select a device address that is not listed in the */dev* directory, you must create the appropriate device files using the *mknod(1)* command. See the *$HPRTroot/etc/conf/cfg/fwscsi.cfg* file.
- If you have installed an expansion kit adapter, the FWSCSI adapter can be installed in the left slot (facing the VMEbus computer front panel) or the center slot of the expansion adapter, depending on the position of any other Graphics System Connect (GSC) mezzanine cards installed on your VMEbus computer.
- On a Model 744rt with an HCRX/VME graphics board, the FWSCSI adapter can only be installed in the left GSC slot (facing the front panel). FWSCSI adapter numbers are 1, 2, or 3, depending on the adapter's GSC slot position.

Installation and Configuration Procedure

1. If you have already set up your HP-RT system, continue to the next step. If you have a new HP-RT system, set up your HP-RT development environment as explained in Chapter 2 of the Edition E0197 *HP-RT System Administration Tasks* manual.
2. Install or update your HP-RT software as explained in Chapter 2 of the Edition E0197 *HP-RT System Administration Tasks* manual. The installation procedure begins on page 2-9. The update procedure begins on page 2-12.
3. Install the A4268A Fast Wide Differential SCSI Adapter on your VMEbus computer as explained in the *Model A4268A Fast/Wide Differential SCSI Adapter Installation and Service Guide.*

   (Model 744 only) If you have a Model 744, do not replace the boot ROM. All Model 744 boot ROM revisions support the Fast/Wide SCSI adapter.

   (Model 743 only) If you do not have the correct boot ROM revision on your Model 743 VMEbus computer, change the boot ROM as explained in the manual listed above. (See the "Configuration Requirements" section above for more information.)
4. Use your VMEbus computer's Boot Console Handler (BCH) interface to identify your FWSCSI adapter number.

   Model 743rt without on-board graphics or HP A4267A graphics card:

   On-board SCSI adapter number is always 0
   FWSCSI_1 is adapter number 1
   FWSCSI_2 is adapter number 2

   Model 743rt with on-board graphics or HP A4267A graphics card:

   On-board SCSI adapter is always adapter number 0
   On-board graphics or HP A4267A graphics card is adapter number 1
   FWSCSI_1 is adapter number 2
   FWSCSI_2 is adapter number 3

   Model 744rt: Enter the command, *Information IO,* from the BCH Main Menu prompt to access information about the I/O devices installed in the option slots.

   On-board SCSI adapter is always adapter number 0
   GSC1 is adapter number 1
   GSC2 is adapter number 2

   Refer to your VMEbus computer owner's guide for more information on the BCH interface.
5. (Optional) By default, HP-RT ignores the SCSI address

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switches on the FWSCSI adapter card. If you want HP-RT to read the device address from the card, set the switches on the card as explained in the *Model A4268A Fast/Wide Differential SCSI Adapter Installation and Service Guide.* Then change the appropriate define statement in the *$HPRTroot/etc/conf/info/fwscsiinfo.c* file on your HP-UX host system from *0xf* to *-1*. For example:

```
#define fw_INIT_ID_SLOT1 -1
#define fw_INIT_ID_SLOT2 -1
#define fw_INIT_ID_SLOT3 -1
```

6. If you are constructing a disk-based system for the first time, complete all of Chapter 4, "Constructing a Disk-Based System," in your Edition E0197 *HP-RT System Administration Tasks* manual, substituting the information below in steps 6a through 7b as appropriate.

   If you have already installed HP-RT on your HP-UX host system and are just installing HP-RT to a FWSCSI disk for the first time, start with "Making the HP-RT Install and Disk Kernel Files" on page 4-4 of your Edition E0197 *HP-RT System Administration Tasks* manual, substituting the information below in steps 6a through 7b as appropriate.

   For this HP-RT 3.01 release, the ADMrt program has been modified to support FWSCSI. Your Edition E0197 *HP-RT System Administration Tasks* manual does not document (or show example screens for) the following steps:

   a) On the "Make HP-RT install and disk kernels" screen (see page 4-5), click on the FWSCSI button to include the FWSCSI driver in the kernel. Then select your disk-based kernel parameters.

   b) From this same screen, select the Modify Disk Install Parameters field (lower left corner of the screen).

   c) When the "Modify Disk Install Parameters" screen appears, change Disk Type to FWSCSI. If you are not using the default device address (Dev Addr) of 6, enter the device address of your disk.

      Also, select the FWSCSI adapter number. This is the number that was listed by your system's BCH interface (see step 4 above).

7. Continue with step 7 on page 4-7 of your Edition E0197 *HP-RT System Administration Tasks* manual.

   a) When you come to the section "Setting the Primary and Alternate Boot Device Paths" on pages 4-10 through 4-13, note the following command changes:

      (Model 744rt) Use the following command to set the primary boot path to your FWSCSI disk (see page 4-10):

      Main Menu: Enter Command > path fwscsi.fwsci_address.logical_unit_number

      For example:

      Main Menu: Enter Command `> path fwscsi.6.0`

      (Model 743rt) Use the BCH menus to set the primary path to your FWSCSI disk (see page 4-11).

   b) When you come to step 5 on page 4-17, use the following command form if you are booting your FWSCSI disk drive from ISL:

      ISL>`rtboot-r scsi.device_address.adapter_number /hp-rt` where the device address is in decimal. The adapter number is 1, 2, or 3, depending on the adapter's GSC slot position.

      For example:

      ```
      ISL> rtboot -r scsi.6.1 /hp-rt
      ```

      where 6 is the default device address of the FWSCSI disk and 1 is the FWSCSI adapter number.

8. You can now complete the rest of Chapter 4 in your Edition E0197 *HP-RT System Administration Tasks* manual. ◧

HP-RT Operating System questions are answered by Geff Blaha, a support engineer in the HP-RT Expert Center. He has worked with and supported real-time systems for over 19 years as a Customer Engineer, Real-Time Response Center Engineer, and HP-RT Expert Center Engineer. He can be reached at geff@cup.hp.com.

CSL Perspective

FOR SEVERAL YEARS, Interex has been studying and planning changes that will position the organization for growth. Many of the trends that affect us as users are putting pressure on users groups to develop new strategies. With the rapid rise of distributed computing, the success of NT in the marketplace, and continued pressure on cost control, IT organizations are looking for more value from their membership in groups such as Interex. I've found that if a users group or association can't transform itself along with the market, it will no longer be supported. Such a fate has befallen groups like DECUS, Uniforum, and SUN Users group. Interex is by no means immune to the changes in the market, yet the Board and staff have been very proactive in ensuring that the organization continues to keep pace with member needs as they change.

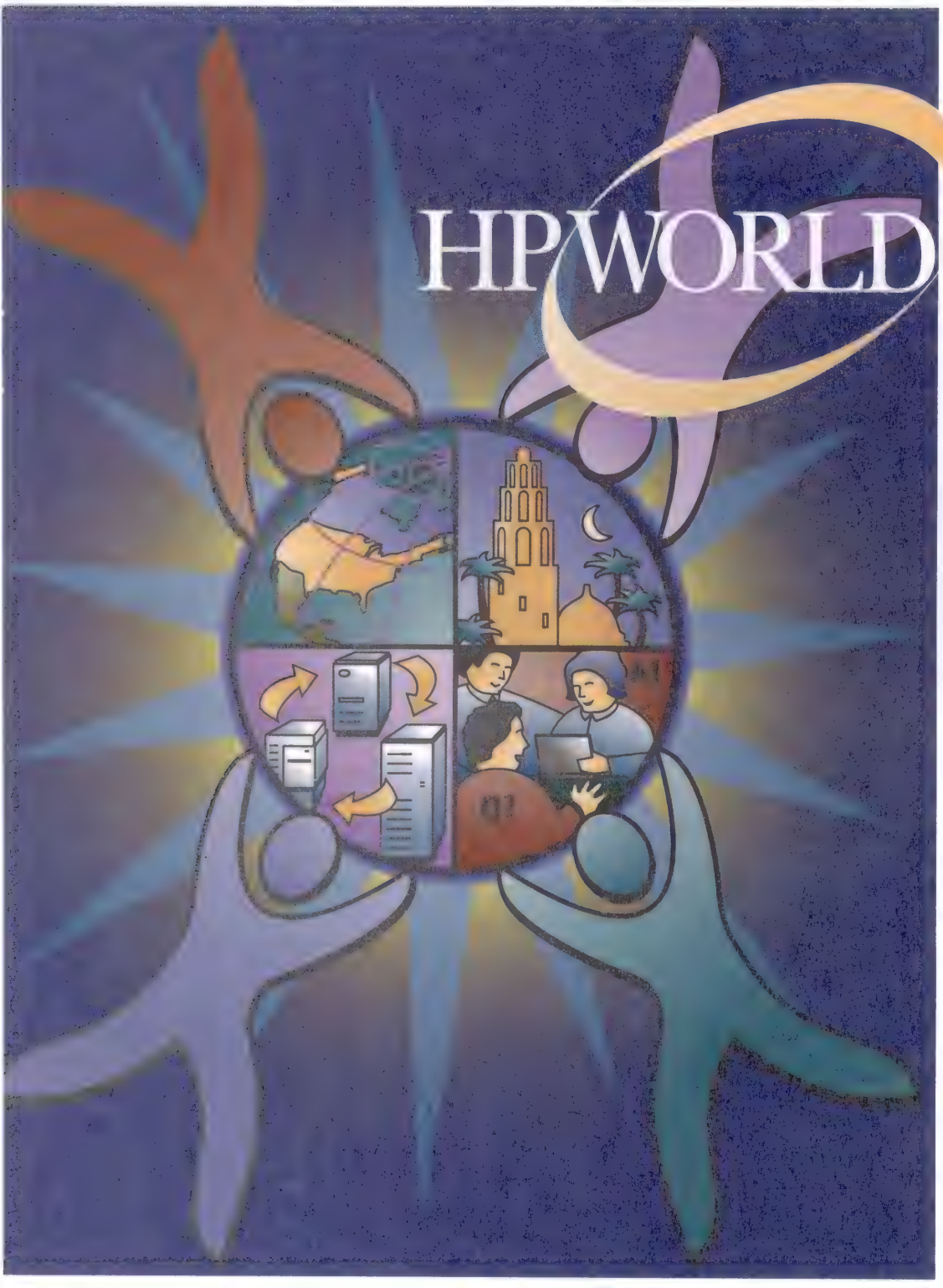
In a nutshell, Interex will be offering more opportunities for member-to-member communications through forums. These forums will be established around like interests and function as strategic advocates for products and services that Interex may offer and as venues where issues can be discussed with vendors. They also will provide opportunities for assisting existing related SIGS to address their issues in a more visible way. Some possible forums are MPE, HP-UX, system admin/management (cross platform, functional), Internet/intranet, etc. I see this as a very positive step in raising the visibility of member issues and experiences for the benefit of all of us.

The second change is the establishment of "task forces" as a way of dealing with short-term, highly focused activities with a finite life. The FAST CD project is a good example of this concept; the team is established for the life of the project, utilizes the required competent volunteers, and then dissolves once the task is finished. Interex envisions quite a few of these task forces, therefore the need for more members to be involved. Within the Software Services committee (the successor to the CSL Coordinating committee), we've determined the need for four to eight task forces to be formed and begin work on a number of different issues. It would be unrealistic for the existing committee volunteers to undertake these tasks since it's clearly more than we can handle. That's where you come in. Some of the tasks that we need to accomplish include:

1. HP World Support
2. HP World Swap Tape 3. HP-UX Fast Start
4. Year 200 Safe verification (each platform)
5. Possible MPE Fast Start
6. Software support Q & A mailing lists/news groups

If you think you have an interest in getting involved in these efforts, please contact me or the Volunteer Development Committee at vdc@interex.org or Gayle Crossley at 1-800-INTEREX, extension 603. ◧

Paul Gerwitz is chairman of the Contributed Software Library committee and a Technical Consultant at Hewlett-Packard. For 16 years, he was a technology specialist and analyst at Eastman Kodak in Rochester NY. He can be reached at 610-408-6526 or via e-mail at gerwitz@interex.org.



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interex **AUGUST 2–7, 1998** **SAN DIEGO CONVENTION CENTER**

Ethernet Port Server

Central Data Corporation has announced its new EL-160 EtherLite Port Server. The EL-160 auto-detects the presence of either 10Base-T or 100Base-T Ethernet links, allowing the unit to operate smoothly in either mode. Its 16 asynchronous serial ports support speeds of 230 kilobaud, perfect for connection to high-speed modems, terminals, printers, and other RS-232 peripherals. The EL-160 is compatible with HP-UX, Windows NT, SCO Unix, and Java.

The El-160 provides real, local serial ports, which appear as local ttys under UNIX, and as native COM ports under Windows NT. Traffic from all 16 ports is serviced by one TCP/IP session. Benefits are less overhead at the host, less traffic on Ethernet, and simple installation. Also, the locally administered, full "hardware-style" ports allow much greater control compared to traditional terminal server ports.

The EL-160 EtherLite Port Server is priced at $1,795.

Contact Central Data, phone: (800) 482-0315 or (217) 359-8010, Fax: (217) 359-6904.

Continued from Page 13

New from New Dimension Software

Enterprise Production Management

New Dimension Software has released its CONTROL-M Option for R/3 module, which allows CONTROL-M enterprise production control and scheduling software to support jobs in SAP R/3 systems running on Windows NT. Operations personnel can manage and automate the setup, scheduling, and execution of processes running across a multiple-platform computing environment.

CONTROL-M Option for R/3 also allows operations personnel to define and run SAP jobs directly from CONTROL-M and to analyze the SAP job log as part of CONTROL-M's SYSOUT facility.

The product is also available for HP-UX and other operating systems.

Pricing starts at $34,560.

Enterprise Output Management

New Dimension Software has announced CONTROL-D/Decollation Server, completing the company's line of Enterprise Output Management products.

CONTROL-D/Decollation Server adds UNIX and Windows NT servers to process reports generated anywhere in the enterprise. The decollation process separates production reports into appropriate subsets based on the recipient and business requirements. It also indexes the reports and assigns ownership, destination, and life-cycle attributes to report sections.

CONTROL-D/Decollation Server pricing starts at $15,995.

Contact New Dimension Software, phone: (800) 347-4694 or (714) 757-4300, fax: (714) 756-3900, http://www.ndsoft.com.

Storage Management Software

Programmed Logic Corporation (PLC) has announced an agreement with Invincible Technologies Corporation to license SnapShot, PLC's online backup technology. SnapShot will be included in Invincible's new LIFELINE 2000 high-availability and fault-tolerant NFS, CIFS, and application-specific server solutions for mission-critical client-server environments.

The integration of SnapShot will enable LIFELINE 2000 users to back up and restore server data with full integrity while files are open and in use by other applications on the enterprise. Online backup functions enable administrators to implement system backups without shutting down the server and causing user downtime, and ensures the data integrity of files which must remain open during the backup process.

Contact Programmed Logic Corporation, phone: (908) 302-0090, http://www.plc.com.

Rapid Prototyping System

Stratasys, Inc. has announced its "ABSolute ABS" rapid prototyping package for $99,000. The complete package, available in North America, consists of the FDM1650 modeler, QuickSlice software, training, installation, standard 90-day warranty, and start-up ABS material supply.

The "ABSolute ABS" package provides all the necessary elements to produce 3D models, prototypes, and tooling patterns and masters in ABS (acrylonitrile butadiene styrene). Outputting models early in the design process for review and verification can result in savings up to 85 percent in time and money. The strength of the completed ABS models allows for form, fit, and functional testing of parts without the cost of expensive prototype tooling.

Operating in an office environment, FDM1650 builds exceptionally strong ABS parts up to 10x10x10 inches. The software is designed with a Windows-like user interface for simple and quick file processing. The system runs on Silicon Graphics, Hewlett-Packard, Windows NT, and Sun platforms.

Contact Stratasys, phone: (612) 937-3000, fax: (612) 937-0070, e-mail: fdm@stratasys.com, http://www.stratasys.com.

GUI Development

MetaCard Corporation has announced the MetaCard 2.1 multimedia authoring tool, which supports cross-

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Switchable RS-422/RS-232 Port Products

ST-1622 and EL-162 EtherLite Port Servers

Central Data Corporation has announced that its serial expansion line has broadened to include two new products with individually switchable ports: the ST-1622 scsiTerminal Server and EL-162 EtherLite Port Server. Both servers allow users to individually select between RS-232 and RS-422 ports from the same server. They are compatible with UNIX, HP-UX, Windows NT, and Java.

Both models provide 16 real ports that appear as local ttys under UNIX and as native COM ports under Windows NT.

The ST-1622 scsiTerminal Server connects externally to a standard SCSI-2 bus, without consuming a single internal card slot.

The EL-162 EtherLite Port Server can auto-detect and operate in either 10Base-T or 100Base-T Ethernet links.

Each server is priced at $1,795.

Contact Central Data, phone: (800) 482-0315 or (217) 359-8010, fax: (217) 359-6904.

platform development. It runs as a native 32-bit application on Windows 95/NT and UNIX. Applications developed on any platform can be run on any other platform without recompiling or other preprocessing. Native look and feel are available on all platforms.

MetaCard 2.1's new features make building complete graphical applications, multimedia presentations, CBT systems, and online documentation easier. A new palette-based development environment makes extensive use of MetaCard's new controls and language features.

With MetaCard 2.1 even non-programmers can develop full featured client-server applications quickly and easily.

Contact MetaCard Corporation, phone: (303) 447-3936, e-mail: info@metacard.com, http://www.metacard.com.

Virtual Machine Tool

SPRING has announced NCSIMUL, a machine-tool simulation package that verifies and optimizes NC programs for 2.5 to 5 axis milling and turning machines. Users can now test programs offline on the computer, instead of on shop floor production machines.

The layout, terminology, and symbols of the user interface replicate the machine tool environment with which operators are familiar. The program is driven through a series of simple, intuitive pop-up and pull-down menus that guide users through selection of the machine tool, tool library, CAD models, rough stock, clamps, etc. NCSIMUL runs on HP-UX and other UNIX workstations and on Windows NT/95 computers.

NCSIMUL consists of four modules. The View module reads and displays the NC program in various formats and supports over 20 controllers. The Interface module imports CAD files by direct translation. The Verify module defines rough stock, simulates material removal, and verifies machining according to dimensional and angular measurements of the part. Finally, the Move module provides a total simulation of the machine tool, including geometric and kinematic definition, as well as management of linear, angular motion, and range.

Contact SPRING via the French Technology Press Office, phone: (312) 222-1235, fax: (312) 222-1237, e-mail: ftpousa@aol.com.

Photogrammetry Software

3D Construction Company has announced its new 3D Builder Pro Version 3.0, which builds detailed and accurate 3D models from photographs—complete with full surround, seamless, photo realistic textures. 3D Builder Pro Version 3.0, the new close range photogrammetry software, allows for the processing of photos to obtain accurate field measurements and to create 3D "as built" CAD models. The product features New CAD style modeling tools for curves and shapes, offers fast and easy modeling of curved shapes without the need for target points, and new automatic camera orientation for faster setups of 3D projects.

3D Builder Pro Version 3.0 makes it easier to streamline 3D model creations. Also included is the new VRML 2.0 export with data files small enough to use on the Internet.

3D Builder Pro Version 3.0 is priced at $695.

Contact 3D Construction, phone: (423) 543-8917, fax: (423) 543-4011, e-mail: threedc@usit.net.

UNIX/Windows NT Integration

ICL has announced Centrivex Swift, the first of a new Centrivex line of software tools to be sold over the Internet. It offers UNIX workstation capability on Windows NT platforms to enable systems administrators to easily integrate UNIX and NT systems and share data between the two platforms.

Centrivex Swift enables organizations to exploit their existing investment in

UNIX as they incorporate an increasing number of Windows NT platforms into their IT environments. Swift provides more than 45 of the most commonly used UNIX utilities. Designed for ease-of-use, Swift enables users to access more utilities from a graphical interface featuring menus and toolbars within the Swift shell.

Centrivex Swift is priced at $159.

Contact ICL, phone: (714) 855-5505, fax: (714) 458-6257, http://iclsoft-tech.com.

Web-Enabled Database Access

UniPrise Systems, Inc. has announced Tango/DAL, a new integrated software solution that combines Uniprise's Database Access Language technology with EveryWare's Tango, a Web-based rapid application development tool. The combination provides for enhanced browser access to databases in rapidly expanding intranet/extranet environments. The new software provides Web-enabled access to virtually any corporate database from any browser using Tango Enterprise applications.

The new Tango/DAL bundle is priced starting at $1,295.

Contact UniPrise Systems, phone: (714) 864-2000, fax: (714) 864-2001, http://www.uniprise.com.

New from Hummingbird

NFS Maestro Version 6.0

Hummingbird Communications Ltd. has announced NFS Maestro Version 6.0 for Windows 3.x and Windows NT/95. NFS Maestro provides complete NFS Version 3 support, an integrated NIS Services application with NIS password management support, and Jconfig, a Java-based remote application management system that reduces the overall cost of ownership of Hummingbird software by enabling automated configuration and management of NFS clients and TCP/IP applications.

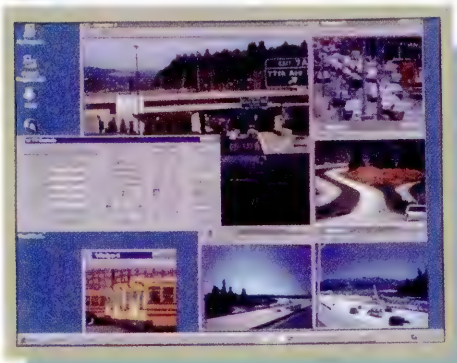
NFS Maestro's performance enhancements include NFS over TCP, support for NFS Version 3's extended access control list support, and enhanced NIS functionality.

NFS Maestro is priced at $395.

Terminal Emulation

Hummingbird Communications has announced HostExplorer Version 6.0, the company's high-performance mainframe terminal emulation suite. HostExplorer is a TN3270E, TN5250, and Telnet terminal emulation application suite for all Windows platforms that delivers high-performance connectivity between PCs, mainframes, and other hosts over standards-based TCP/IP networks, and includes a fully integrated

W.TV



Video Windowing for Windows 95/NT

RBG Spectrum has announced W.TV, its Windows-compatible interface software for use with its SuperView 1000 video windowing system.

The SuperView processor is an external hardware peripheral that allows the user to display multiple live video windows on a computer display. The video signals may be in any standard video format and may be received from any source, including broadcast, live camera feed, videotape, etc. The SuperView multiple-video display system may be controlled through front-panel buttons, a terminal emulation program running through the RS-232 port, or by using W.TV from within a Windows environment.

W.TV displays live video images in standard windows on a computer monitor. These windows can overlap and be sized, moved, maximized, or minimized like the windows in any 95 or NT application.

Contact RGB Spectrum, phone: (510) 814-7000, fax: (510) 814-7026, http://www.rgb.com.

set of robust TCP/IP applications.

HostExplorer enables users to run multiple host sessions alongside desktop productivity applications without expensive hardware upgrades. It includes Sconfig and Jconfig, which enable administrators to easily install, manage, and configure thousands of HostExplorer desktops across the enterprise. Users can manage mainframe sessions through the Windows interface and can customize virtually every aspect of their mainframe sessions through Windows Explorer.

HostExplorer is priced at $245.

Contact Hummingbird Communications, phone: (415) 917-7300, fax: (415) 917-7310, http://www.hummingbird.com.

New from IEM

DDS-3 DAT Solutions

IEM, Inc. has announced a range of backup solutions based on HP's DDS-3 DAT drive. The DDS-3 drive features a sustained transfer rate of 1 MB/second native and 2 MB/second with 2:1 data compression. DDS-3 drives can store 24 GB (with 2:1 compression) on a single 4-mm data cartridge (native capacity is 12 GB).

IEM offers a selection DDS-3 solutions, including stand-alone drives and libraries.

SAP R/3 and Informix Backup

IEM has announced Alexandria Backup Librarian, which provides complete, automated client-server backup of both UNIX file systems and Oracle, Informix, Sybase, SAP, and CATIA databases. Alexandria's true client-server architecture allows clients to back up to multiple servers across heterogeneous networks, file catalogue information to be centralized or distributed, and operations to be launched from remote machines. It provides enterprise-wide management of media, devices, and data. Alexandria access is through a windowed GUI, but a command-line interface is available for system administrators and experienced UNIX users.

Contact IEM, phone: (970) 221-3005 (USA) or +(44) 01455 239000 (U.K.), e-mail: info@iem.com.

Software Management

Aqueduct Software has announced the Aqueduct Profiler, which collects information on how software applications are being used and automatically sends it back to the software organization over the Internet.

The Aqueduct Profiler is a software management product that attaches to the application program and sends usage data back to the vendor via Internet e-mail protocols as the application is being run. Thus the software team can run a much more accurate and definitive beta test, determining prior to shipment which features are most critical to customers or how product "crashes" may be related to specific feature usage patterns.

Implementation of the Aqueduct Profiler has no effect on the application's performance or behavior. The product supports client, server, and stand-alone applications written for HP-UX and Windows NT/95.

Pricing starts at $15,000 per year.

Contact Aqueduct Software, phone: (650) 463-8700, fax: (650) 463-8706, e-mail: info@aqueduct.com, http://www.aqueduct.com.

New from Esker

TN3270 Data Access

Esker has announced Tun PLUS 8.6, which runs on UNIX, Windows NT, and IBM platforms.

Tun PLUS 8.6 includes three fully configurable modules—Tun EMUL, Tun SQL, and Tun NET. Tun EMUL (the emulation module) extends TN3270E support for the enterprise and provides access to SNA gateways for access to

pooled and fixed LU connections. Tun SQL (the data access module) gives added support for DB2 on IBM MVS and full DB2, Oracle, and Informix support on NT. Tun NET's SMB file sharing protocol has been adopted by Microsoft Windows clients.

Web-to-Host Integration

Esker has announced Esker PLUS, which provides all-in-one Web-to-host access and integration.

Esker PLUS gives end users immediate parallel access to the legacy applications and data on most corporate systems straight from their client and without having to wait for MIS to install and configure their desktop. Authorized end users simply deploy Esker PLUS from their Web browsers when they need it.

EskerPLUS provides system administrators with tools needed to install, configure, and offer end-user deployment of all applications and services. Individually customizable end-user configurations can be created and installed once and then made available to specific clients. Developers do not have to modify existing mission-critical systems to create new applications and reports that leverage investments in the network.

EskerPLUS supports UNIX, Windows NT, and other platforms.

Contact Esker, phone: (415) 675-7777, fax: (415) 675-7775, e-mail: info@esker.com, http://www.esker.com.

Attention vendors: New product announcements should be sent to New Products Editor, hp-ux/usr magazine, Interex, P.O. Box 3439, Sunnyvale, California 94088-3439, USA, or e-mail: wright@interex.org.

Deadline for submission is two months prior to publication.

On January 1, 1998 HP computer users can celebrate more than the New Year.

If you are a Hewlett-Packard computer user, January 1, 1998 will give you a lot more than the New Year to celebrate. Starting that day, Interex will introduce its new membership program designed to give you even greater access to the products and services that you need to be successful.

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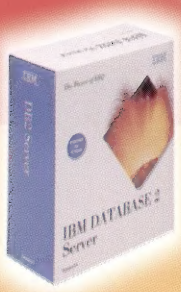

IBM software for HP-UX

Cut superhuman tasks down to size.

Michel Lotito of Grenoble, France was known as Monsieur Mangetout ("Mr. Eat-Everything"). Among the delectables he consumed were chandeliers, TV sets and an entire Cessna light aircraft. Now there's an appetite for big challenges. Which also describes IBM's DB2 for HP-UX. A great majority of the Fortune 500 already use DB2 to manage vast, complex databases. Today, this scalable solution is ready to go to work in your HP-UX environment – to help keep data safe, secure and easily accessible. In combination with IBM's Net.Data for HP-UX, DB2 can also help you deploy databases in dynamic Web applications. These are just two powerful and proven IBM solutions now available for HP-UX. Others include MQSeries, ADSM, Lotus Domino, Transaction Server and more. For further information – including opportunities for resellers – contact your HP distributor or visit the IBM Software for HP-UX Website at **www.software.ibm.com/hp**

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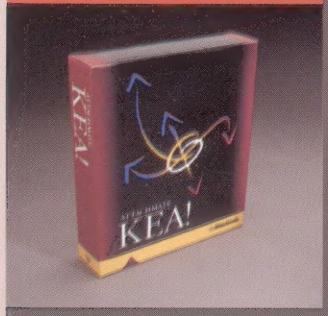

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